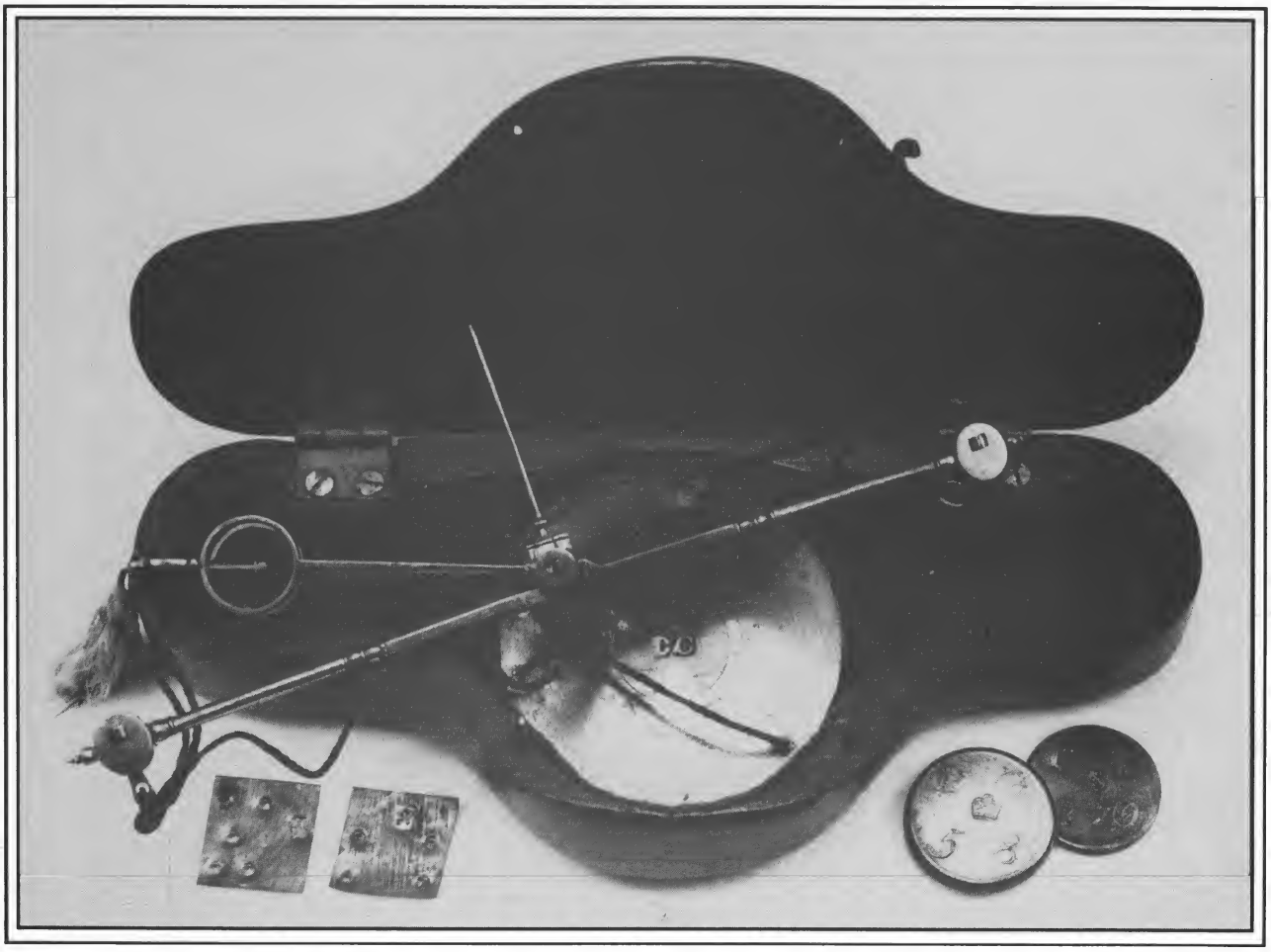
ISASC

EQUILIBRIUM®

QUARTERLY MAGAZINE OF THE INTERNATIONAL SOCIETY OF ANTIQUE SCALE COLLECTORS

1994—ISSUE NO. 1

PAGES 1749-1776



Cover Picture

When I started to prepare the article on Irish scales, (see page 1755–1769,) I told my son that there were no specifically Irish characteristics, except for a tendency to use curved boxes. However, the more I studied them, the more I found the same themes recurring, and the more I came to recognise Irishness. It can be summed up as a delicate touch, a refined sensibility and a refusal to compromise. It cannot be said that the English never achieved the same results, but the Irish achieved them consistently. I recommend that you handle an Irish coin scale, because words are not the medium in which to convey the subtleties to which I refer, and photographs give only the faintest idea of the pleasures derived from handling an Irish coin scale.

The box on the cover was made by one of the Daniel Crosbys. As it was made for the minimum of weights, (probably just the guinea and half-guinea,) it was made after 1774, and Daniel Crosby Senior worked until his death in 1785, so it could reasonably be attributed to that Daniel. Alternatively, Daniel Crosby Junior was working from 1785 until the third of a guinea was minted in 1793, and could have made it. Such scales continued to be made in that style until well into the nineteenth century. **DC** was stamped in the centre of the pans. We have no evidence as to whether Daniel Crosby Junior took over the **DC** mark that was definitely used by Daniel Crosby Senior.

Irish characteristics are represented in this box by (1) the curved box, (2) the cut from solid mahogany base, (3) the filed away edge between the base and the lid, to allow a thumb nail to lift the lid, (4) the thin beam, (5) the oval box ends, (6) the tall shears, (7) the small diameter sight-hole, (8) very fluffy, densely woven, green cloth and (9) the stamped pans.

The unusual features include (1) a rosewood lid, (2) the use of two hooks, (3) weights stamped at the London Mint, (4) no recesses for the weights, (5) pans large enough in diameter to fill the recess, and (6) no trade label.

See pages 1760–1725 for more details about the Crosbys.

EQUILIBRIUM is published quarterly in January, April, July and October.

Editor—Diana Crawforth-Hitchins 15 Hawthorn Ave, Headington Oxford OX3 9JQ, England

ISSN-0893-2883

Can any member of ISASC help me with my research? I need details of late Mediaeval nesting weights.

The weights fitted inside the larger cups in the normal manner, but they were stylistically different from the 18th & 19th century ones. They were broader and flatter than later examples, and frequently had buttresses or deeply modelled grooves on their outer surfaces.

Fig. 1

Fig. 2

Fig. 3

Outer Cup:-

In the earliest examples, the out-bulging buttress had a corresponding groove up the inside of the cup. See Fig. 1. The rim of the cup was decorated with birds' eyes, (dot in a circle.) A closing pin slid across the top, held in position by the holes in two lugs (or 'ears',) which protruded above the level of the rim of the outer cup. Later, the design changed to an angular, more box-shaped outer cup, with the inner surface more smooth and rounded, and a flat lid held shut by various means. Fig. 2. Later, the outside of the cup was also rounded. See Fig. 3.

Fig. 4.

Inner Cups:–
The earliest specimens were angular on the outside and on the inside. See fig. 1. They had birds' eyes round the rim. Later examples were round on the outside and the inside, initially with birds' eyes, then later given a smooth finish. Eventually, the top rim was decorated with concentric circles.

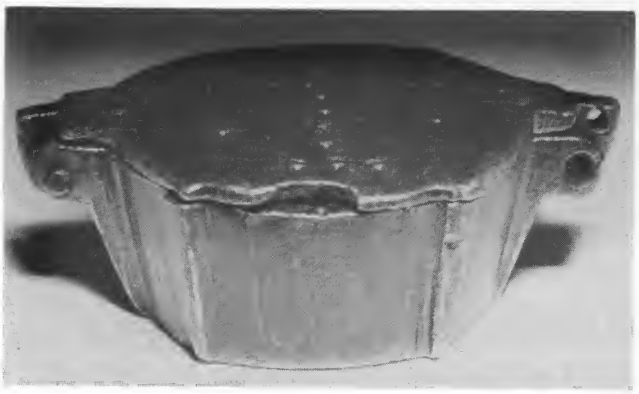


Fig. 5.

Closing Pins:–
The earliest sets did not have a lid. The cups were secured by having the smallest weight shaped like the stopper of a medicine bottle, with a hole drilled through the knob of the stopper. When the closing pin was driven through one 'ear,' through the central knob, and through the other 'ear', the weights were immobilised. The closing pin was also a weight.
When lids were first used, the central weight was made without a knob, as a solid lump, (not a cup,) initially decorated with birds' eyes, and later on decorated with concentric circles.

Please will any member privileged enough to possess one of these rare pieces, or knowing of one in a museum, send the following details to Ritzo?
Design of outer cup (angular outside/angular inside; angular outside/rounded inside; round/ round;)
Pin design, or lid design.
Fastening method for lid (sketch slightly open.)
Mass, (could be marcs, ounces or pounds.) Weigh each cup separately using your smallest and most accurate weights.
Measurements of each cup in millimetres if possible. (Height, diameter of rim, diameter of base.)
Material (usually bronze, later might be brass, rarely lead.)
Decoration and marks (birds' eye, concentric circle, notches.)
Stamps, if any (rare.)
Corrections (lead additions, pattern of filing.)
Finding place, Date of any associated finds.
Provenance.(previous owners,)
Present owner. Privacy would be respected, if desired.
Photographs would aid the research greatly.

Fig. 6.

Ritzo Holtman is the editor of Meten & Wegen, the magazine of the Netherlands Scale Collectors Society. (Vereniging Verzamelaars van Maten en Gewichten.)

Review

'Irish National Inventory of Historic Scientific Instruments: Interim Report 1990', abbreviated to "Irish Interim Inventory", by Charles Mollan, published by the Royal Dublin Society and the Irish Science and Technology Agency, 1990. Available from the author, 17, Pine Lawn, Newtownpark Avenue, Blackrock, Co. Dublin, Ireland. 809 pages. Price retail £36 including packing and postage within Britain, at £39 to Europe at Printed Paper rates, and at £39 to the rest of the world by surface mail.

At first glance, this is an unappetising book, because it is just a list of each museum's or collection's instruments, with three lines devoted to each instrument, plus five/ fifteen lines of description. There are no photographs, and no discussion about the instruments.

There *is* a proper explanation of what institutions were chosen, the categories, methodology, hardware and operating system, software, analysis of the fields used and a discussion of how that could be applied to other inventories and catalogues, printing, searching and finding, additional software and conclusion. Mollan explains what instruments were chosen, and has, in the main, included the same range as Project Simon, but, because his cut–off date was 1900, has had to grapple with electrical instruments and spectroscopy. Because he was making sure that all Irish instruments were properly recorded, he has occasionally widened his categories to include dubious objects like banjo barometers and camera lenses. How nice to have the little human weaknesses left in! All the above fits onto nine pages only, but what a mine of information it is.

There are indices at the end, by name of maker/ supplier, and by name of instrument, and appendices of Irish–made instruments out of Ireland, which demonstrate all too clearly the lamentable entries in some museums' own inventories, being spattered with comments like "No measurements available". One appendix deals only with instruments exported by Grubb of Dublin, and the second appendix deals with all other Irish instruments exported out of Ireland (which, obviously, are named.)

If you are starting to catalogue your collection, especially if using a computer, then read the first section and follow Mollan's advice, even though there are more modern software programmes available now. Having set up a similar system for Project Simon, working at the elbow of Michael Crawforth, and having helped to catalogue private collections, I consider Mollan's method superb, clear, easy to use and as quick as any cataloguing could be.

The inventory covers seventeen museums and institutions, some miscellaneous institutions (each of which has a few instruments), private collections (identified only by a code) and sales in Ireland (instruments recorded in the sale–room, and later auctioned to unidentified people.)

When sorting by fields in the *computer*, all instruments made in any one country can be called up, although countries are not identified in the *book* (unless the signature includes an address.) As Mollan used appropriate software, almost any other fact can be called up – all one makers' work, all one areas' work, all work done at one date, etc., which can also be achieved by searching the book, but slowly and with difficulty.

The compact use of three lines illustrates the clarity of Mollan's thinking:–

Line 1 for example:– **"1705 May192 Balance".**
1705 is the arbitrary four digit inventory number, which is used to call up the full entry in the computer (which is a greatly expanded version of the description line entry, with proper descriptions, details of inventor, manufacturer, and any other relevant facts.) 2935 is the highest number, not including the separate numbers used for instruments outside Ireland.
May is the code showing which collection it is in (in this case, St Patrick's College, Maynooth.)
192 is the arbitrary number assigned to the instrument in the St Patrick's collection.
Balance is the briefest possible name of the instrument.

Line 2 for example:– **"Robt. W. Paul. London, N. T. Mason 5, Dame St, Dublin"**
The whole line gives the signature, retaining the case of the letters and the punctuation used.

Line 3 for example:– **"B 207 x 178 x 18 ; H420. 1900–1916.A".**
B defines what has been measured, of the 98 possible bits of instruments that could appropriately be measured. In this case it is the base.
207 x 178 x 18 is the size in millimetres.
H420 is the height in millimetres.
1900–1916.A is the date, qualified by a letter signifying the way it was arrived at – date from associated document, date of catalogue including that instrument, etc. There are 21 possible qualifications, right down to guesstimate. A means "dates of maker at that address".
Lines 4 onwards give the salient points of the computer entry, description, comments, and sources of information. A few of the descriptions are unhelpful. Eg, "White–metal beam, brass pans, tassel hold. Case. Shears & pointer. Mahogany case with signature label pasted in case." A non–scale compiler has difficulties in pin–pointing the important aspects of a scale!

What relevance does this book have to ISASC members apart from being an object lesson in how to catalogue? Twenty nine balances are included, six made by Irish makers. Because we rarely see Irish scales, it is useful to know where they are, and to have some idea of what they are like.

The surprise was to see how very few scales have survived in Irish collections. Surely, scientists in Ireland had just as great a need to weigh as any English scientist, and laboratories must originally have had scales in considerable numbers, if only to assess the experiments done on all the other instruments that *have* survived. Why have only eleven laboratory balances survived?

I learned some more about the products made/ sold by scale makers, such as a telescope by Horne & Thornthwaite, and an ammeter by Becker. I now need to find out what a "Keates balance" and what an "Electric balance" is. It was interesting to learn that Yeates & Son of Dublin made electromagnetic balances.

I recommend this book as being an exemplary inventory, in which the author has constantly kept in mind that the user wants access to precise information, without being inundated in too many details. Buy this book, particularly if you are about to embark on a similar exercise. D F C–H

Project Simon is to be published early in 1994, but its findings are broadly known.

Irish Scalemakers/ Retailers

D Crawforth–Hitchins

This is a first attempt to list the scales and weights makers of Ireland. Some confusion arises from the status of Assay Masters and Official Makers of Weights for Ireland, who may not have made weights themselves, but got founders to make weights on their behalf. As the weights bore their symbols, they were legally responsible for them, and their working dates give us a good idea as to when the weights were made, so they are included in the list.

Official Maker of Weights for Ireland		Assay Master of Dublin		Master of Goldsmiths' Company of Dublin		Scalemaker to Bank of Ireland	
?–1679	Richard Smart						
1680–1683	Richard Lord	1670–1692	Richard Lord	1673–74	Richard Lord		
1683–97	Cuthbert and Paris			date?	John Cuthbert		
1697–1735	Vincent Kidder	1697–?	Vincent Kidder	1697	Vincent Kidder		
1736–1751	William Archdall	1736–1751	William Archdall				
1751–1759	Henry Archdall			1772–73	Henry Archdall		
1760–1782	James Warren			1777–78	James Warren		
				1779–80	John Locker		
						1783–?	Daniel Crosby (which?)
						1796–98	David Pickering
						1801	William Pickering
						1810	James Pickering
1835	Samuel Gatchell & Sons made Standards						

A table of the coins used in Ireland gives an approximate idea as to what coins Irish people had available to them. See page 1766. As usual with gold and silver, coins that were no longer current were saved and hoarded, still valued as bullion, and no doubt people continued to do deals with them, but the Government in London attempted to control the coinage, and the Table conforms to the Official View!

It would be silly to duplicate the excellent publication coming out in January, 1994, by Bente and Paul Withers, (see page 1770,) but there has to be some overlap of information here.

The dates put beside each maker are those dates for which we have documentary evidence. No doubt ISASC members will extend the dates as new knowledge becomes available. Evidence on Irish makers is so sparse that any little item is of great value, and I beseech all readers to send every scrap of evidence that they have to the editor for publication. Remember that this magazine is used as a source of reference by the major museums and by the top scholars in our field of metrology.

Henry Archdall working 1747–died 1790

1752 Darby Square, Werburgh St, Dublin
1765 Coleraine St, Dublin

Henry Archdall was successor to William Archdall. He was classified as a maker of money weights at Darby Square, Werburgh Street, in a Trade Directory of 1752. He was also Inspector for the Trustees of the Linen Manufacture, when at Coleraine Street, listed in Wilson's Directory of 1765.

Fig. 2. Henry Archdall's unofficial guinea design of 1750. Correct weight. Note the mirror image of his initials on the right. Photo Withers.

Whereas his predecessor was only authorised to make weights for foreign (meaning foreign to England,) coins circulating in Ireland, Henry Archdall could and did made weights in 1750, for the worn (English) guinea of 5 pennyweights 3 grains. He could legally make them without being an Official Maker (of coin weights), because the Proclamation was not concerned with the making of guinea weights. The guinea weights were not "Official" so they were not to the Official design, (i.e., they did not have an Irish harp on the obverse with the weight in pennyweights and grains below the harp, and they did not have the Coat of Arms of the Hanovers on the reverse.) Instead, Henry Archdall had on the obverse, a lovely monogram of HA intertwined with the mirror image of HA, and the date 1750 on the other side. See Fig. 2.

Fig. 3. Official design for the New Louis d'or. Die made 1751. ¾ grain light. Photo Numismatica Wein.

When Henry Archdall was appointed to be Official Maker of Weights in 1751, he made weights conforming to the Official design, and apparently did not cut new dies for his unofficial guineas. The official weights did not bear his monogram, and we can only attribute them to Henry Archdall because they were made in 1751, during his time of responsibility. See Fig. 3. Henry inherited the die for his Port Piece weight from his father, William. See below. He was much more accurate in his weight–making than his father, with an average loss only 0.9 grains below the Official standard, (although this figure must be treated carefully, because so few examples were seen by the Withers, to be recorded in their book.)

Henry Archdall continued to work, at something, after he was replaced by James Warren as Official Maker of Weights in 1760, but he might not have continued to make weights. No weights for the New Standard of 1774 are known with his initials.

William Archdall working c. 1702–died 1751

1736 Skinner Row, Dublin
Darby Square, Werburgh St, Dublin

William Archdall, son of John Archdall of Lusk, deceased, was apprenticed to David King in 1695. He was Warden of the Goldsmiths' Company of Dublin from 1709 to 1713. He was a member of the Common–Council of the City of Dublin by October, 1736, as the representative of the Goldsmiths' Company. He was then living in Skinner Row, where several other members of Goldsmiths' Company lived. From September 29th 1736, he was Collector of the Revenue in the Country of Ireland, Assay Master, Receiver of the Duties on Plate, and Maker of Weights for all

Foreign Coin current in Ireland, at his Office in Goldsmiths' Hall in Warburgh Street on Tuesdays and Fridays, and at his house in Skinner Row. A busy man!

By 1737, he had dies for striking money weights. His weights can be identified by the weights of the coins. In earlier Proclamations, the Portuguese Piece, (8 Escudos,) was to pass at full value if it was 18 pennyweights and **9** grains. When William Archdall made his dies, the Portuguese Piece was to pass at full value only if it was 18 pennyweights and **10½** grains. If the coin weighed less, two pence was to be deducted for each grain that it was light. As he made his designs to conform to the Official design, pennyweights and grains' numerals were shown below the harp on the obverse and he put the date 1737 on the reverse. See Fig. 4.

Fig. 4. William Archdall's 1737 design for the Quadruple Pistole, shown 2½ times life-size. Only identified as being by Archdall because it was dated during his time as Official Maker of Weights for Ireland. Photo George Mallis.

William had a die for the Port. Piece (see Withers no. 2711a,) with the date 1737 and a harp with high wings, which he later replaced with a die showing a harp with lower wings, (see Fig. 4,) a die that was inherited by his son. He made dies for all the current coins in Ireland (except the English ones,) as shown on the chart on page 1766. He used the dies, without changing the date, until his death in 1751, as he held the post of Assay Master and Official Maker of Weights until he died. [The date on weights, normally, bore the date of the Proclamation relating to that coin, although there are exceptions to that rule.]

The die for William Archdall's Port. Piece weight was inherited by his son, Henry Archdall. See Withers, no. 2711 and 2727.

One obverse die used by William Archdall was first used by Vincent Kidder in 1714, (his predecessor as Official Maker of Weights,) a weight for the quadruple Pistole. See Withers no. 2712 and 2712a. The obverse of another weight, for the 2 Escudos, was, presumably, made by Archdall, as the weight specified was Proclaimed in 1737, but the reverse was struck from a die made by Kidder and was used until it was worn nearly flat. See Withers no. 2635. Otherwise, Archdall seems to have used newly made dies.

The accuracy of his weights was not good. The brass he used may have been so soft that it wore away rapidly, but after making allowances for wear, they were still poor, having lost, on average, 1¾ grains. Individual weights were 3, 9, and 6½ grains light, the worst representing a loss of 18 pennies (or 1 shilling and 6 pence,) every time that weight was used. (Or a gain, if the user was clever, and aware of the inaccuracy!)

He made coin scales, but only one is known to have survived. It contained a very worn label *"Willia_ Archd___ 1, Darby's Sq____ _____ who sells a__ _orts of Money Scal__"* The characteristic Irish box had the attractive curved outline, with the edges polished off. See sketch, Fig. 5. It contained two weights with the 1709 date, for 2 pwt 7¼ grs, (for the ¼ Portuguese Piece, first made legal tender in 1725,) and 6 pwt 22 grs, (the moidore.) It also contained five weights with the 1737 date, for 17 pwt 8 grs, (the quadruple Pistole,) for 18 pwt 10½ grs, (the Portuguese Piece which passed at the higher weight from 1737 onwards,) for the 8 pwt 16 grs, (the double Pistole,) for 9 pwt 5¼ grs, (the half Portuguese Piece of the higher weight, after 1737,) and 4 pwt 8 grs, (the Pistole.) The beam had swan–neck ends and the pans were stamped with a crowned **S D** , an unidentified maker.

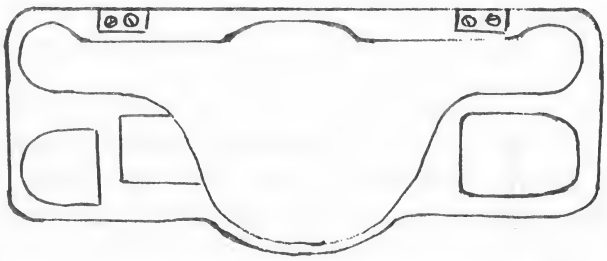


Fig. 5. This box contained weights made after 1737, and before Archdall died in 1751, so gives some idea of when the characteristic Irish curved box developed. The rectangle abutting the pan recess represents the grain locker with a tiny sliding lid opening into the recess.

Austin working c. 1860

c. 1860 9, Westmoreland, Dublin

A Mordan postal roberval scale was inscribed *"AUSTINS OF DUBLIN"*. Mordans made their beautiful postals for many retailers over a seventy year span, and the scales are only possible to date if the postage rates were inscribed on the plate, or if the weights were for Ps, [Postages,] a unit of ½ oz. used between 1840 and 1871.

Another roberval postal scale, engraved and on a walnut base with brass filigree, had a green paper label glued under the base stating *"Austin, 9, Westmoreland, Dublin."* See EQM, page 409, for illustration. Coloured paper labels were fashionable between about 1850 and 1885.

W & T Avery Ltd working 1914 on

1914 156, Capel Street, Dublin

Averys took over J Newman's business at 156, Capel St in 1914. Presumably, they wanted a retail outlet and repair depot in Dublin to service all the Avery machines used in Ireland.

John Barrington working about 1735

at the right–hand Corner of the New Inn Yard, Pill Lane, Dublin.

Seaby's recorded a set of coin weights with a set of apothecary weights, for the period 1709 to 1760, made by John Barrington. No other details are known.

Samuel Bradford working 1851

1851 Bagwell Street, Clonmel.

Samuel Bradford was a manufacturer of an office knife that contained a letter weighing apparatus, pen blade, paper cutter and a pencil. This device was exhibited at the Great Exhibition in London, 1851.

Browne working c. 1850

c. 1850 Nassau Street, Dublin

A postal 'rolling-pin' scale made by J & E Ratcliff (to the design of R Willis' patent of 1840,) had a blue trade label stuck to its base, "Sold in.....B(?)rowne, Nassau Street, Dublin....." The label was so badly rubbed that it was illegible. Coloured paper labels were fashionable between about 1850 and 1885. J & E Ratcliff last worked in 1862, the year that E Ratcliff started working alone.

CC

Appears above the Arms of the City of Cork, being an abbreviation of City of Cork.

CD

Appears above the Arms of the City of Dublin, being an abbreviation of City of Dublin.

J & I Clarke working 1800

1800 Aston Quay, Dublin

A trade beam at Strokestown Park House is marked *"J & I Clarke, Aston Quay, Dublin, 1800".* It is 38 inches (1150 mm) long, with swan neck ends and double hooks for the load. (See Mollan.)

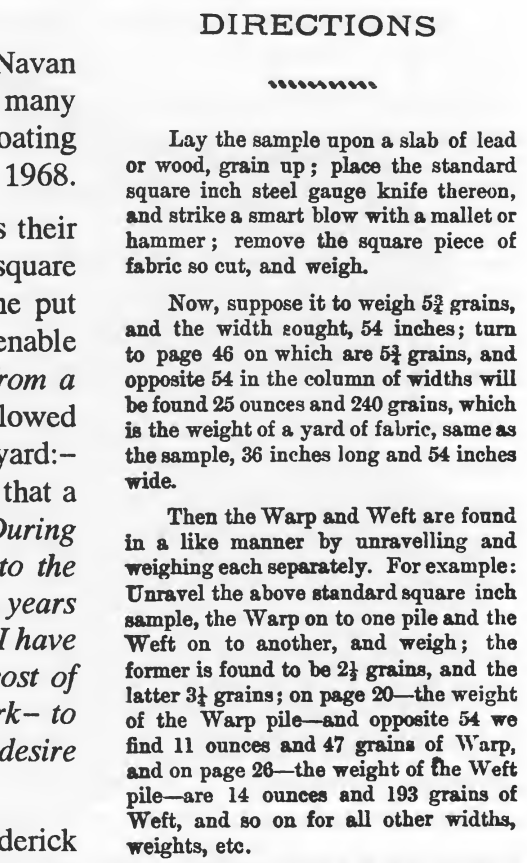
Dr. Frederick Clayton working 1868–c. 1910

1868–1888 Ardbraccan House, Navan.

F & J Clayton brothers established a woollen factory in Navan in about 1837, which combed, spun and manufactured many kinds of woollen cloth, (ranging from cashmeres and coating cloths to Cheviot tweeds and travelling rugs,) until about 1968.

In about 1868, Dr, Frederick Clayton joined the firm as their chemist, and used his apothecary scales to weigh one square inch of sample cloth, using grain weights. In 1887, he put similar scales on the market, with a book of Tables to enable the buyer of cloth to determine the weight per yard *"from a small sample, the size of half-a-crown.".* His Tables allowed for cloth ranging in weight from 76 grains to 65 oz per yard:- an astounding range. He supplied a heavy steel die so that a square inch could be accurately cut. To quote him: *"During 20 years' connection with my firm, I have been alive to the necessity of economising time and labour; and for many years this "Desiderata" has elicited so many encomiums, that I have decided upon giving it- at a nominal price to cover cost of scales and weights, steel die, and printing this little work- to the practical business man, with the fervent hope and desire that he, too, may find it of paramount importance."*

The scales were presumably bought in bulk by Frederick Clayton. They look like cheap English apothecary scales, with emerald green cords and royal blue velvet lining in the box. The box was plain, unvarnished oak with wire hinges, just big enough to hold the book of Tables 7½ inches by 2¼ inches, (180 mm by 80 mm.)



DIRECTIONS

Lay the sample upon a slab of lead or wood, grain up; place the standard square inch steel gauge knife thereon, and strike a smart blow with a mallet or hammer; remove the square piece of fabric so cut, and weigh.

Now, suppose it to weigh 5¾ grains, and the width sought, 54 inches; turn to page 46 on which are 5¾ grains, and opposite 54 in the column of widths will be found 25 ounces and 240 grains, which is the weight of a yard of fabric, same as the sample, 36 inches long and 54 inches wide.

Then the Warp and Weft are found in a like manner by unravelling and weighing each separately. For example: Unravel the above standard square inch sample, the Warp on to one pile and the Weft on to another, and weigh; the former is found to be 2½ grains, and the latter 3¼ grains; on page 20—the weight of the Warp pile—and opposite 54 we find 11 ounces and 47 grains of Warp, and on page 26—the weight of the Weft pile—are 14 ounces and 193 grains of Weft, and so on for all other widths, weights, etc.

Fig. 6. Printed in the Fabric Tables by Frederick Clayton, M D, M A, Ph D, F S A.

F & J Clayton working 1837–c. 1900

Navan.

Retailer of the scales made by Dr. Frederick Clayton, the scales being available from F & J Clayton, Spinners and Manufacturers, Navan, Ireland.

F Clayton and Sons working c. 1900 on.

Navan.

Dr. Frederick Clayton's scales were available from F Clayton and Sons, Spinners and Manufacturers of Navan.

Michael Cormick working 1761–1779

1761–1779 Christ–Church Lane, Dublin.

Michael Cormick, goldsmith, at Christ–Church Lane, Dublin, was in Trade Directories between 1761 and 1779. He was said by Lavagne to have made gold weights marked with a Tower.

Michael Craig working 1775

1775 Parliament Street, Dublin

An advertisement in Faulkner's Dublin Journal, 6th April 1775, *"Tower money weights, under patent of the Great Seal of England, landed this day, and to be had at Craig's in Parliament Street, on which the public may rely with utmost safety. Scales and beams constructed on an entirely new construction".*

Tower Money weights have not survived in any quantity. One (of a year later,) was illustrated on page 501 of EQM, with "TOWER STANDARD 1776" in three lines on the obverse, and "DW GR 5 8" in two lines on the reverse. It was stamped with the Crown, the verification mark of the Royal Mint, that was housed within the Tower of London. The sonorous phrase *"under Patent of the Great Seal of England"* was not a phrase commonly met, but possibly meant patented weights of some sort. If that was what he meant, perhaps I have drawn attention to the wrong design.

The advertisement is ambiguous. Did Craig make scales and beams? Or did Craig import the scales? My guess is that the scales were made in England, as there was a great flowering of 'new constructions' at about this time, (Anscheutz and Schlaff, S Henry, Bradford Darby and Hulls, John–Joseph Merlin and many others,) but one must allow for an equal flowering in Dublin about which we know nothing as yet.

Daniel Crosby (Junior) working 1785 – 1804

1785–1804 36, Pill Lane, Dublin

If it was not known that Daniel Crosby Senior had died in 1785, we would assume that all the directory entries from 1753 to 1804 referred to one man. However, we must assume that the later entries refer to Daniel Crosby Junior. As Daniel Crosby Junior was a brazier at 36, Pill Lane, (the address of Daniel Crosby Senior,) perhaps his relationship to Daniel Crosby Senior was closer than his relationship to James Crosby at 70, Pill Lane.

The label (see Fig. 11,) attributed to Daniel Crosby Senior, (which could, at best, only have been printed two years before his death,) may also have been printed by Daniel Crosby Junior. If it was, perhaps Daniel Crosby Junior was Scale-maker to the Bank of Ireland from 1785 until 1796, the year that David Pickering got the contract.

The [light Avoirdupois ¼ oz?] weight in a David Pickering box of scales that was stamped **DC** was probably stamped by Daniel Crosby Junior, as they were nearly contemporary, whereas Daniel Crosby Senior was working long before David Pickering was working.

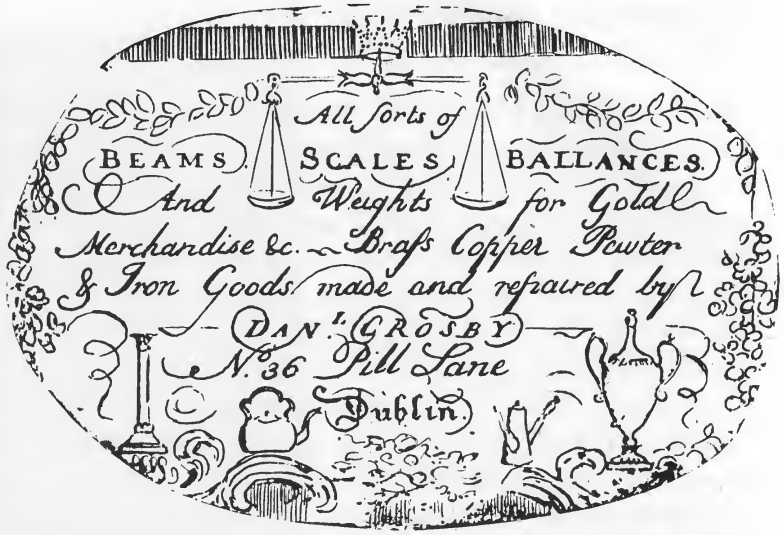


Fig. 7. Daniel Crosby Senior used this label in his earlier boxes. If we knew when the numbering of houses started in Dublin, it might give us a first possible date. The label was very indistinct and has been touched-up as well as possible.

Fig. 8. The label was clearly designed as a rectangle, and has been crudely trimmed to fit Daniel Crosby Senior's elegant curved box. Why didn't he have an oval label? Note the lack of a second hook and loop. Tall shears. Box-end beam, 8½ inch long. Whipple Museum, Cambridge, acquisition no. 427.

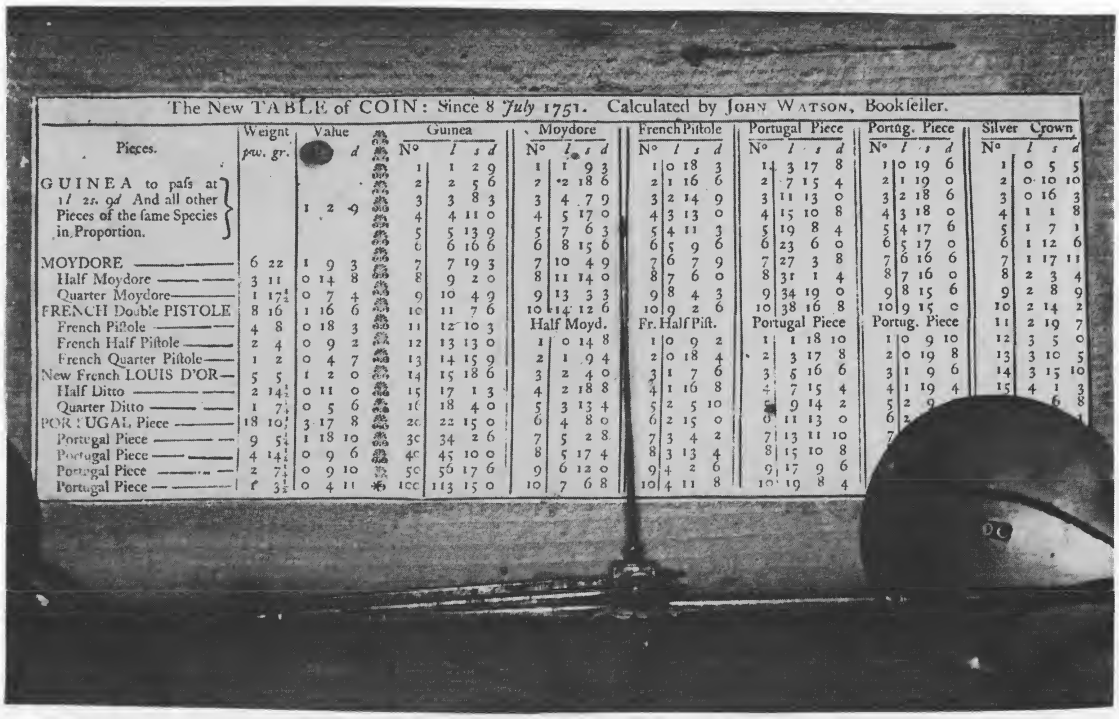
Daniel Crosby (Senior) working 1753 –died 1785

1753–1785 at the sign of the Crown and Scales, 36, Pill Lane, Dublin

The first evidence we have, for this maker of delightful scales, was an advertisement in the Dublin Journal of 29th September 1753. *"Daniel Crosby, at the Crown and Scales in Pill–Lane, has lately imported from London superfine hard metal Pewter Dishes and Plates, Oval dishes, Mazareens, scalloped Dishes and Plates, Oval and Round Tureens, Round Fish Drainers, Standishes, Quart and Pint Tankards and Cans, Winchester Measures, plain and chased Tea Kettles and lamps, gilt Branches, Chandeliers, Brass Candlesticks for Tables, Offices or Shops of the newest fashion, great choice of Scales and Weights, and many other Articles too tedious to mention, all which he will sell on the most moderate Terms; with all Sorts of Gold and other Scales, Pewter, Brass and Copper Goods of his own Manufacture."*. Note that he imported pewter and brasswares, and Scales and Weights, but also **made** Gold and other Scales. For the curious, "superfine hard metal pewter" was probably pewter that had antimony added to the alloy.

Fig. 9. Guinea weight to the New Standard of 1774, by one of the Daniel Crosbys. The obverse was struck in the same die as the guinea weight of James Crosby, who worked from 1769–90. Photo Withers.

Daniel Crosby was classified in Trade Directories as a brazier from 1761 until his death in 1785. His earlier trade label stated *"All sorts of BEAMS, SCALES, BALLANCES And Weights for Gold. Merchandise etc. Brass copper & Pewter & Iron Goods made and repaired by DAN^L CROSBY, No 36 Pill Lane, Dublin,"* with a picture of the Crown and Scales at the top of the label, and candlestick, kettle, coffee pot and an urn drawn at the bottom of the label. See Fig. 7.


The New TABLE of COIN: Since 8 *July* 1751. Calculated by JOHN WATSON, Bookſeller.

Pieces.	Weight pw. gr.	Value l s d	Guinea N°	Guinea l s d	Moydore N°	Moydore l s d	French Piſtole N°	French Piſtole l s d	Portugal Piece N°	Portugal Piece l s d	Portug. Piece N°	Portug. Piece l s d	Silver Crown N°	Silver Crown l s d
GUINEA to paſs at 1l 2s. 9d And all other Pieces of the ſame Species in Proportion.		1 2 9	1	1 2 9	1	1 9 3	1	0 18 3	1	1 18 10	1	0 9 10	1	0 5 5
			2	2 5 6	2	2 18 6	2	1 16 6	2	3 17 8	2	0 19 8	2	0 10 10
			3	3 8 3	3	4 7 9	3	2 14 9	3	5 16 6	3	1 9 6	3	0 16 3
			4	4 11 0	4	5 17 0	4	3 13 0	4	7 15 4	4	1 19 4	4	1 1 8
			5	5 13 9	5	7 6 3	5	4 11 3	5	9 14 2	5	2 9	5	1 7 1
			6	6 16 6	6	8 15 6	6	5 9 6	6	11 13 0	6	2	6	1 12 6
MOYDORE	6 22	1 9 3	7	7 19 3	7	10 4 9	7	6 7 9	7	13 11 10	7		7	1 17 11
Half Moydore	3 11	0 14 8	8	9 2 0	8	11 14 0	8	7 6 0	8	15 10 8	8		8	2 3 4
Quarter Moydore	1 17½	0 7 4	9	10 4 9	9	13 3 3	9	8 4 3	9	17 9 6	9		9	2 8 9
FRENCH Double PISTOLE	8 16	1 16 6	10	11 7 6	10	14 12 6	10	9 2 6	10	19 8 4	10		10	2 14 2
French Piſtole	4 8	0 18 3	11	12 10 3	Half Moyd.		Fr. Half Piſt.		Portugal Piece		Portug. Piece		11	2 19 7
French Half Piſtole	2 4	0 9 2	12	13 13 0	1	0 14 8	1	0 9 2	1	1 18 10	1	0 9 10	12	3 5 0
French Quarter Piſtole	1 2	0 4 7	13	14 15 9	2	1 9 4	2	0 18 4	2	3 17 8	2	0 19 8	13	3 10 5
New French LOUIS D'OR	5 5	1 2 0	14	15 18 6	3	2 4 0	3	1 7 6	3	5 16 6	3	1 9 6	14	3 15 10
Half Ditto	2 14½	0 11 0	15	17 1 3	4	2 18 8	4	1 16 8	4	7 15 4	4	1 19 4	15	4 1 3
Quarter Ditto	1 7¼	0 5 6	16	18 4 0	5	3 13 4	5	2 5 10	5	9 14 2	5	2 9	16	4 6 8
PORTUGAL Piece	18 10½	3 17 8	20	22 15 0	6	4 8 0	6	2 15 0	6	11 13 0	6	2		
Portugal Piece	9 5¼	1 18 10	30	34 2 6	7	5 2 8	7	3 4 2	7	13 11 10	7			
Portugal Piece	4 14½	0 9 6	40	45 10 0	8	5 17 4	8	3 13 4	8	15 10 8				
Portugal Piece	2 7¼	0 9 10	50	56 17 6	9	6 12 0	9	4 2 6	9	17 9 6				
Portugal Piece	1 3½	0 4 11	100	113 15 0	10	7 6 8	10	4 11 8	10	19 8 4				

Fig. 10. The ready–reckoner, published in 1751, useful for many subsequent years. in a made–up oak box by Daniel Crosby, Senior. Pans stamped **DC**. Shears shorter than on the scale above.

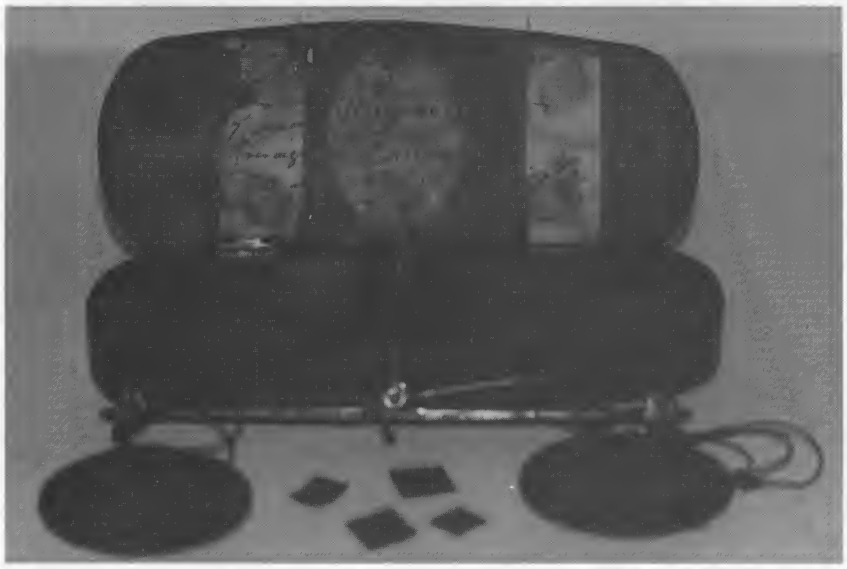


Fig. 11. A rare shape of box. Hand-dated 1783, the year that the Bank of Ireland was established. Jerry Katz collection.

Another early label in a made-up box showed a *"Table of Coin since 8 July 1751. Calculated by John Watson, bookseller".* See Fig. 10. This showed the greater value of gold in Ireland, in relation to the value of silver. An English guinea could be exchanged for 21 shillings in silver in England, but for 22 shillings and 9 pence in silver in Ireland. The Table included the French Pistole and the New French Louis d'or, coins currently available in Ireland at that time, even though they were very uncommon in England. Why was the weight of the guinea not given?

A later label of Daniel Crosby's was smaller and simpler, merely stating *"Scale Maker to the Bank of Ireland",* the Bank being formed in 1783. This leads us to assume that Crosby made large equal-arm scales on pillars, as were needed in banks, although none have survived to be recorded in the literature. [As the Bank was formed only two years before the death of Daniel

Fig. 12. Only one hook. The guinea weight had a hole too small for its diameter, and sticks out into the beam's space. Nicely made five part hinges. The box was filed to allow a thumb nail in, to open it.

Crosby Senior, we must consider the possibility that this label was also printed by Daniel Crosby Junior, and that he also got the contract to make scales for the Bank of Ireland.]

The distinctive feature of Daniel Crosby's coin scales was the glossy, highly polished, cut-from-solid mahogany boxes, nicely lined in thick green baize. Although no two seen have an identical profile, they are easily noticed because of their curved outlines and rounded-off edges, both on the lids and the bases. Where the lid met the base, the wood was filed away, to allow a thumb-nail to be inserted to open the box easily. (In England, the lid was commonly made to overlap the base slightly, so that the lid could be lifted easily.) The beams were very fine, with oval box-ends. One had shears almost half the length of the beam, an Irish characteristic in the late 18th and early 19th century. One had round sight-hole shears of unusually small diameter, another Irish characteristic, and a very neatly made pendant. Most had **DC** stamped in the pans. (See Mollan.)

Fig. 13 Did Daniel Crosby Junior also use this stamp?

A box of scales with David Pickering's trade label contained a little bronze weight that seems to be a very light Avoirdupois ¼ oz. The weight was stamped with Daniel Crosby's **DC** stamp. As David Pickering was a contemporary of Daniel Crosby Junior, perhaps this weight should be attributed to Daniel Crosby Junior.

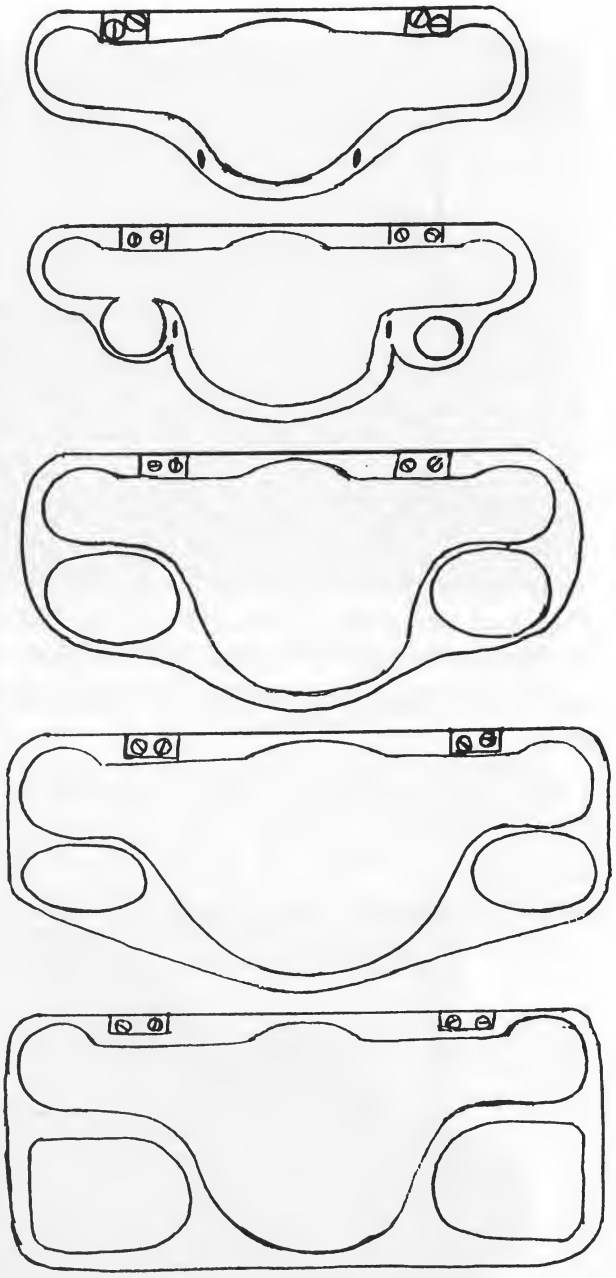


Fig. 14.

James Crosby working 1769 – 1790

1769–1770 Pill Lane, Dublin
1784–1790 70, Pill Lane, Dublin

James Crosby was classified as a beam, and scale maker, not a brazier, in Trade Directories between 1769 and 1790.

James Crosby had guinea weights (for the guinea passing at 5 pwt 8 grs,) with a smooth reverse with his initials **I*C** in the centre, nicely proportioned and with initials of the same style as Daniel Crosby's initials. The obverse of these guinea weights were struck

Fig. 15. James Crosby's guinea weight to the New Standard of 1774. Obverse struck in same die as Daniel Crosby's. Withers' photo.

from the same die as Daniel Crosby's guinea weights. See Withers no 2761 and 2762.

David Pickering put his stamp, **D.P** in a denticulate rectangle, on a guinea weight made by James Crosby. See Withers, no. 2818 and 2819. Withers deduces that David Pickering bought up the stock of James Crosby.

John Cuthbert (otherwise Cuthbeard) & Henry Paris working 1683 – 1698
1683–1698 Dublin

Authorised in 1683, by Charles II, to make weights for Ireland with a crowned harp on one side and the weight on the other. *"The stamps to be flat, and the circle to be smooth and polished, that no dust might gather in, and each weight to be stamped with the number of pennyweights on one side, and the crown and harp on the other, and to be sold at not more than twelve pence for all the weights, being eight in number, viz., for the Ducatoon, half Ducatoon, whole plate and Peru pieces, and half and quarter pieces thereof, a two pennyweight, a pennyweight, and a half pennyweight, such being sufficient to weigh the several sorts of silver coin, then current in that kingdom. Standards of all those weights were to be left in the hands of sheriffs of counties, mayors, etc. of cities, etc., for determining or preventing all differences about any weights for money. And any persons who should pay or receive any money by any other weights, were to be proceeded against and punished according to law, as keepers and users of false and unlawful weights."* [Quotation from Ruding, reprinted in Lawrence.] A whole plate was a silver 8 Ryals (also called a piece of 8, or a Peru Piece.)

Fig. 16. Cuthbert & Paris' 4 Reale weight of 1683. Shown 2½ times life-size. George Mallis' photo.

It is interesting that sheriffs and mayors were to hold a set of Standard Weights for coin. Did the same regulation appertain to England in 1683? Have any Standards survived?

Why were grain weights not included? How could anybody weigh coins using the pennyweights without grain weights?

Cuthbert was a goldsmith freed in 1670, and fined in 1691 for working bad silver. Paris was a Founder and a Lt. Colonel in the Dublin Militia. They had dies made in 1683 after the Proclamation had specified the design to be used. [Prior to that Proclamation, Richard Lord had been at liberty to invent his own design.] They made a good design, reasonably intricate, to discourage forgers, but easy to read and packing in a lot of information. See Fig. 16. The obverse had a wonderful Irish harp with a voluptuous female form, a big crown above the harp with 1683 divided to be each side of the crown, and THE STANDARD OF IRELAND round the edge. The reverse had a huge **XX** D 16 G in the middle (when it was for a Ducatoon of 20 pwt 16 grs,) and ACCORDING TO AUTHORITY round the edge. It was not until John Kirk in London designed weights, that any better designs were thought of within the British Isles. They were careful to place the marks centrally on the blank, unlike some later weight makers, giving the customer

COINS USED IN IRELAND, 1652 - 1840

Year	Country	Name(s) of coin	Metal	Dwt	Grs	Dwt	Grs	Mite
1652 to 1775(?)	Spain	8 Ryals, Pieces of 8, Rix dollar, Pillar Piece of 8, French Louis, Mexico dollar, Flemish dollar, cross dollar, 8 Reales, Old Peru piece of 8, Whole plate, Peru piece, Spanish dollar, Seville dollar	Silver			XVII		
"	Spain	4 Ryal	Silver	VIII	12	VIII	XII	
"	Spain	2 Ryal	Silver	IIII	6	IIII	VI	
"	Spain	1 Ryal *(minted 1714, not proclaimed, but 1 found)*	Silver			2	3	
1683 - 1737	Spain	Ducatoon	Silver			XX	16	
"	Spain	½ Ducatoon	Silver			X	8	
"	Spain	¼ Ducatoon	Silver					
1683		*Harp on obverse. Weight in large numerals on reverse.*						
1683		Two pennyweight *See Note 3 below.*		II		Id		
"		One pennyweight		I		d		
"		½ pennyweight				½		
1689 - 1709	France	3½ pence, 3½ sous	Silver					
1695 - 1709	Portugal	Crusado *See Note 4 below.*	Silver					
"	Portugal	½ Crusado	Silver					
1709		*Change to weights with small numerals below harp*						
1709 - 1751	Spain	4 Pistol, Quadruple Pistole, Doubloon *French pistoles current 1709-1775*	Gold			17	8	
"	Spain	2 Pistol, Double Pistole,	Gold			8	16	
"	Spain	Pistol, Pistole	Gold			4	8	
"	Spain	½ Pistol	Gold			2	4	
"	Spain	¼ Pistol	Gold			1	2	
1709 - 1775	Portugal	Moidore	Gold			6	22	
"	Portugal	½ Moidore	Gold			3	11	
"	Portugal	¼ Moidore	Gold			1	17½	
1714 - 1775	France	New French Louis d'or, French Guinea	Gold			5	5	
"	France	½ New French Louis d'or	Gold			2	14½	
1714 - 1718	France	New French silver Lewis, Ecu	Silver			XIX	14	8
"	France	½ New French silver Lewis,	Silver			IX	19	4
"	France	¼ New French silver Lewis, Quardesque	Silver			4	21	12
1725 -1775	Portugal	Portuguese Piece, 8 Escudos, Double Joey, Peca, Dobra, *See Note 5 below*	Gold	18	10½	18	9	
"	Portugal	4 Escudos, Joey,	Gold	9	5¼	9	5	
"	Portugal	2 Escudos,	Gold	4	15	4	14½	
"	Portugal	1 Escudo	Gold	2	8	2	7¼	
"	Portugal	½ Escudo	Gold	1	3½	1	3	
1775	*English*	*coins previously legal but now the **only** legal currency*						
1775	England	Guinea, *See note 6 below*	Gold					
"	England	½ Guinea	Gold					
1762	England	¼ Guinea	Gold					
1797	England	$^{1}/_{3}$ Guinea	Gold			1	18	
1816	England	Sovereign *See Note 7 below*	Gold	5	2½	5	2¾	
"	England	½ Sovereign	Gold	2	13 $^{1}/_{8}$	2	13 $^{3}/_{8}$	

Fig. 17. Note 1a... 20 mites=1 grain. 24 grains=1 pennyweight. 1 pennyweight=1.555 grams

Note 1b...There are two columns showing the weight at which the coin was considered full weight and at which it would pass at full value, because there were two ways that the numerals were stamped on the weights.

Note 2...In 1652, English gold coins were legal tender, but the proclamations did not refer to them, weights were not made for them, and apparently, the Irish had no English gold coins to use.

Note 3...Pennyweights were to be sold with coin weights to enable users to weigh unspecified coins.

Note 4...The Crusado was included in the Proclamation of 1695, but no weights are known.

Note 5..Port. Piece minted 1722, and made legal tender in 1725. In 1737 the full current weight of the Port Piece was increased from 18 pwt 9 grs to 8 pwt 10½ grs.

Note 6a...In 1750-51, the guinea passed in Ireland for full value if it was 5 pwt 3 grs, although minted at 5 pwt. 9 grs.

Note 6b...In 1774, the guinea coined since 1771 passed at full value only if it weighed 5 pwt. 8 grs or more. The half guinea passed at 2 pwt 16 grs. In 1774, the guinea that had been coined before 1st Jan 1772 passed at full value even if it weighed only 5 pwt 6 grs. The half guinea passed at 2 pwt 14 grs, and the quarter guinea at 1 pwt 7 grs.

Note 7...The weight at which the sovereign passed for full value was altered from 5 pwt 2¾ grs to 5 pwt 2½ grs. I cannot ascertain the date of the change.

confidence that they were good at their job One half–Ducatoon weight was very worn and pitted, and had lost 21 grains, which was so great a loss that it seems deliberate. I have not included it in the thoughts below about the accuracy of Cuthbert and Paris' work.

Fig. 18. The weight for 1 Pennyweight, by Cuthbert & Paris. Crown over 1683. Withers' photo.

They had to make pennyweights to sell as part of the set of coin weights, as instructed by the Proclamation of 1683, and they used three different dies for the obverse of the II pennyweight. See Withers no. 2575, 2575a and 2575b. They used four different dies for the obverse of their I pennyweight. See Withers no. 2576, 2576a, 2576b and 2576c. Was this because they used a relatively soft metal for their dies? [When tests were carried out at the Mint in London in 1863, it was found that about 100,000 sovereigns could be struck before their die deteriorated.] One cannot envisage Cuthbert and Paris' striking 300,000 pennyweights.

The pennyweights in the 1683 set were a different design from the weights for foreign coins, with a large crown placed centrally with the date in small numerals below it and no harp. See Withers no. 2591 and 2592 and Fig. 18. These weights, too, had a pleasing and well proportioned appearance.

They made new dies for 8 Reales and 2 Reales in 1694. It is not known why. Were the old dies worn out? Broken? Stolen?

Again, in 1695, Cuthbert and Paris made new dies for no apparent reason, after a Proclamation lowering the value of the gold coinage. Because people on the Continent were giving more gold in exchange for silver coins than could be got in Ireland, Irish merchants shipped abroad any silver coins that they could lay their hands on and made a quick profit of about 10%. This exacerbated the draining of the silver coinage out of Ireland, leaving the people in great distress.

Cuthbert and Paris were removed and discharged in 1697 for *"unskilfully making weights to the great prejudice of His Majesty's good subjects"* and Cuthbert was imprisoned. He was compelled to write a Petition, apologising, and was brought before the Speaker of the House to be reprimanded. He was released, but Vincent Kidder was appointed instead. See page 1772 to 1773, for the full, juicy scandal.

The Withers' weighing of every weight makes it possible to judge, to some extent, how prejudicial Cuthbert and Paris' weights were. Obviously, we must take account of some wear, say one grains' wear. But as the average loss on their weights was only 1½ grains, it is difficult to accuse them of any great wrong–doing. Admittedly, two weights had lead plugs, correcting a loss, but only three weights were really poor, with losses of 3½, 4¼ and 5½ grains. The Proclamation of 1695 stated *"that for every grain wanting in a gold coin there was to be an allowance of twopence. In the silver coins there was to be an allowance of three pence for every pennyweight the coin was light."* So the light weights had a loss of silver of only of a farthing's value, the smallest copper coin, and I wonder whether Kidder was stirring things up to try to get the Official Maker of Weights appointment for himself.

SD working about 1730?

Dublin?

The pans of a scale in a box by William Archdall bore the initials SD, surmounted by a Crown. Presumably this unknown scalemaker was working about the same time as William Archdall, (c. 1702, died 1751.)

Johnstone Davis working 1789–1797.
1789–1796 24, Usher's Island, Dublin

Johnstone Davis, beam and scale maker, 24, Usher's Island, Dublin, was in Trade Directories from 1789 until 1796. He was in the Trade Directory for 1797, at the same address but as a parchment maker!

No work is known.

William Davis working 1848
1848 4, Bull Lane Dublin.

William Davis, beam and scale maker, 4, Bull Lane was in one Trade Directory of 1848.

No work is known.

DG
Sometimes placed on weights so that they look like makers' initials, but they are abbreviations of D for pennyweights and G for grains. D is used as an abbreviation for pennyweight because the Latin word for a pennyweight was a Denarius. Educated English people tended to use a Latin word in preference to an English word, even in an English text, to prove how educated they were!

Gatchell, Lamprey & Rendell Ltd working 1910
1910 14, Bachelor's Walk, Dublin

Presumably one of Robert Gatchell's sons went into business with Lamprey and Rendell, as they were listed as scalemakers of 14, Bachelor's Walk, Dublin in the Inspectors' Handbook of 1910.

Robert G Gatchell & Sons working 1890–1896
1890–1896 7, Dawson Street, Dublin

Robert G Gatchell & Sons were in Trade Directories as Ironmongers, plumbers, gas–fitters and beam and scale manufacturers at 7, Dawson Street, Dublin from 1890 until 1896.

Robert Gatchell must have been either very elderly when his name was first used, or he was a grand–son or great–grandson of Samuel Gatchell.

They were succeeded by Maguire & Gatchell at the same address in 1897.

No work is known.

Samuel Gatchell working 1791–1835
1791 17, West New Row, Dublin
1794–1798 11 Abbey Street, Dublin
1799–1835 87, Pill Lane, Dublin

Samuel Gatchell was a hardware merchant at 17, West New Row in Trade Directories in 1791. He was an iron merchant at 11, Abbey Street from 1794 until 1798. He moved to the premises (previously used by Henry Jackson,) at 87, Pill Lane in 1799, still working as an ironmonger. He stayed at the same premises until 1848, by which time his sons had joined the business, but the houses were renumbered in about 1845, and number 87 became number 61.

He had a magnificent trade–card engraved in the Bewick style, and full of symbolism. Justice is sitting prettily on a rock holding her scales up high so that they could swing freely. She holds her sword as if it were a bunch of flowers, and obviously she is not expecting to use it. She has two large parcels by her feet full of good things, and an Irish harp against her knee, being proud to be an Irish woman. A galleon sails serenely over the sea, taking Irish goods to other lands. Samuel Gatchell called himself *'beam and scalemaker and ironmonger'* It has to be one of my favourite trade–cards. (Fig. 19.)

Fig. 19. Wonderful trade card designed before 1835. By the style, I suggest that it was designed in about 1795, when the passion for Bewick prints was at its height. Note the improbable beam ends and the wavy beam. As with all trade cards, the owner had a big outlay to get the card engraved, and numerous cards were re–used, either by the owner at a new address, by other members of the family, or by successors to the business. In this case, the card was used again by Sam Gatchell & Sons. See Part 2.

The trade–card was glued into an oak, made–up box containing an equal–arm beam with large brass pans about 3½ inches (400 mm) in diameter. The large pans suggest that the scale could be used to make up medicines or to weigh coins, a common double use in the late 18th century and early 19th century. This scale was in a private collection, and only one other scale is recorded, in the National Museum of Dublin, with no details recorded about it in Mollan's book.

Weights for the guinea, the sovereign passing at 2 pwt 2½ grs and the sovereign passing at 2 pwt 2¾ grs were marked by Samuel Gatchell, bearing his stamp **S*G**. See Withers, no. 2768, 2769 and 2770. The guinea weight obverse came from the same die as James Pickering Junior's guinea weight. Similarly, the sovereign weights were struck from dies used by James Pickering, and James Pickering claimed to be a weight maker, so probably Samuel Gatchell was ordering his coin weights wholesale from James Pickering.

Fig. 20. Sovereign weight. The sovereign was first minted in 1816. Withers' photo.

Part 2 of this article appears in the next issue of EQM.

Irish Coin Weights

By P & B R WITHERS

43 pages from "British Coin Weights," due to be published in January, 1994.

British Coin Weights. 368 pages plus a 12 page supplement of prices etc. Case bound in high-quality cloth. Covers all British coin-weights including Ireland and Scotland, which each have their own section. 20 page index. Limited edition of 500 copies. Price to ISASC members, including postage and packing, reduced to £87, within Britain. £92 to Europe. $160 **if sent in dollar bills,** (by insured postage,) to USA.

Some comment on the price is needed, because it will surprise most ISASC members. This book is written by professional numismatists in their own time, almost as a hobby. The resulting book is highly professional, and will be the reference book for anybody handling coin weights for the next 50 years. The authors do not claim to have included every coin weight produced in Britain, but they must have included 90 %, and would have included the other 10% if they had seen them. Because there is a full-size photograph of great clarity beside every description, the user can identify virtually every coin weight. This is an incredible achievement, of inestimable value to collectors and to scholars. If every coin weight in your collection is identified and valued, you will have added value to every weight. Try a small calculation. Count your coin weights. Increase each one's value by £1, for the sake of argument. Does the answer come to more than £90? Do you intend to buy more coin weights in the future? Then you should have this book.

As only 500 copies are being printed, I foresee a time, when it is no longer available, when 2nd hand copies will be changing hands at a much higher price. So, you would have an investment, a tool for learning and a pleasure, all in one!

Normally, books are reviewed when they are published. ISASC is in the privileged position of having access to a complete chapter before publication, as the book was written by fellow ISASC members Paul and Bente Withers. It would be invidious to copy the 43 pages relating to Ireland, but readers should be given a taste of the scholarship shown and the lively style of writing. Here is the introduction to the Irish section:-

IRELAND

In the mid 17th century the state of the Irish economy and coinage was chaotic. Ruding quotes:- 'November 5th, 1652. Kilkenny:- Whereas there has been a custom of late years in this country of passing current clipped English money and likewise all Spanish money called Ryals or pieces of eight, with many other sorts of foreign coin, at a far higher rate than true; ordered and declared that it may be lawful for all persons to refuse clipped English money unless tendered according to the true value by weight. That no sort of Spanish money called Ryals or pieces of eight, nor Rix, Flemish or crosse dollars, nor any other of that kind that have usually passed at the rate of five shillings, be henceforth enforced in payment for any more than at the rate of four shillings and sixpence, and the half and quarter pieces in proportion. Likewise, that no Philip's money called Ducatoons, usually received for six shillings, be enforced in payment for or above the value of five shillings and sixpence and the half Ducatoons proportionately. That no French money called Quardesques [Quarter Ecu,] *shall be enforced in payment for or above the value of four shillings and sixpence, and no other foreign coin to be enforced in payment.'*

A 1680 proclamation by the Lord Mayor of the City of Dublin bemoaned: 'loss doth arise to His Majesty's good people, and for that it is notorious that most weights used for the said coins do exceed the standard by several grains.'

The proclamation continued with the statement that Richard Lord, of Copper Alley, was appointed to have a set of standard weights against which all others might be tested and that he was empowered to bring those tested to the standard and stamp (impress) them with the arms of the city of Dublin and mottoes. Lord was to ask no more than one shilling sterling for the sets of weights he sold.

From this one might assume that Lord was a manufacturer of weights. However, Richard Lord, a captain in the Dublin Militia, was a goldsmith, made free in 1657. He was Master of the Dublin Company of Goldsmiths for 1673 – 1674. From 1670, or perhaps earlier, until his death in 1692, he was Assay Master at Dublin. His weights would probably have been made by either a brazier or a founder, guild practice of the time would have insisted upon it. It is not recorded who worked with Lord. When John Cuthbeard, goldsmith, took on the job of manufacturing the gold and silver money–weights, Henry Paris, a founder, is co–specified in the proclamation. Thomas Paris, son of Lt Col Henry Paris, of the Dublin Militia, was apprenticed to Cuthbeard in 1697.

The weights bearing Lord's name are for the dollar, half dollar and quarter dollar. They bear the arms of the city of Dublin. They are dated 1670, a date prior to that of the proclamation by some ten years. Either there is a previous proclamation which we have not seen; the proclamation may be regularising a situation which had already prevailed for ten years; or the date on the weights may be the date when Lord became Assay Master. Dates on Irish weights, as will be seen later, vary from the apparently accurate, to the curiously anachronistic, to the psychic.

A goldsmith's mark, that of Richard Smart of the City of Cork, where he was Master of the Company of Goldsmiths for two years, does exist on a coin–weight in the collection of the National Museum of Ireland. Westropp states that Smart's weights bear the date 1679, however, we can find no date on them. One of Smart's weights, however, does have TH 1679 added to the obverse die. Whilst we do not know the owner of the initials, the date would seem to indicate that Smart's weights were struck prior to 1679.

More weights than those catalogued here will be found if all of the weights specified in the various proclamations were made. To that end, as in other sections of the catalogue, gaps have been left for new weights to be accommodated.

Initially, it seemed that the date on a weight relates to the date of a proclamation, not the date of striking, or date of issue. Weights continued to be struck from those dies until a new proclamation. However, on examining the series of weights struck, some weights appear for coins which were apparently not proclaimed, and others which were not struck until some time later than the date on the weight. These anachronisms are not merely the odd example now and again, as one might expect if they were unintentional mules, but part sets of weights, sometimes as many as five in number. An example of this occurs with weights dated 1718 for the 8 escudo, a coin which was not struck until 1722! There are examples stating the weight as 18 dwts 9 grains – according to the proclamation of 1725, and others, at 18 dwts 10½ grains – which is the weight for the piece proclaimed in 1737. Weights for the 9 escudo, dated 1737 also exist. The first two examples quoted might be mules. However, two varieties of the first mentioned exist, along with three of the second.

In view of the above, weights are catalogued by the date they bear, in descending order of magnitude of the mass stated on the weight, regardless of whether they were intended for gold or silver.
The first weights catalogued bear the immediately recognisable types of the coin they were intended to weigh. They are undated, but probably pre-date the 1680 proclamation. They may be distinguished from French and Spanish weights for the same coins by the numerals stated on them. The French and Spanish weights state XXI (deniers) VIII grains for the 8 reales, while the Irish weights have XXVII d(wts).

Following this introduction, the Withers have allocated an arbitary number to each weight, with text on 4 to 5 lines, giving a full description of all letters, words and numbers, and a description of any symbols. The relationship of parts to each other is included if there more than one die that can be confused with another, for example, "flower touches D" and "right flower does not touch D." Explanations are given, such as, "touchmark of Richard Smart." Comparisons are made between dies, and the Withers draw attention to the repeated use of the same die with different backs. Diameter is given and present mass in grains. All this is shown beside a photograph of both sides of the weight. The photographs are so good that the faintest scratch shows, every little flaw in the dies is apparent, and the modelling of every part of the surface is clear. This amazes me, when so many of the weights were worn down. I was able to put my weights beside their description and sort out exactly what I had.

Seven to nine weights fit onto each page, unless part of the page is given over to straight text, but it still gives some idea of how many weights are included in the whole 368 pages. There are 267 weights illustrated in the Irish section alone, and as they are shown from both sides, the Irish section contains 514 photographs. Is anyone still saying that this book is expensive?

Each numismatic or weighing historic period is dealt with separately, so that any significant changes are high-lighted, and interesting matters are dealt with in some detail. One example:-

John Cuthbeard and Henry Paris
John Cuthbeard and Henry Paris were appointed, jointly, as makers and sellers of the official gold weights. Cuthbeard was a Dublin Goldsmith, made free in 1670. In 1691 he was fined for working bad silver. He died in 1705. Paris was a Founder and a Lt Col in the Dublin Militia. They seem to have come to grief in 169$^{7}/_{8}$. Westropp records some, but not all of the story. Details of what must have been one of the juicy scandals of the period are given in a proclamation by the Lords Justices and Council, of 21st February 169$^{7}/_{8}$:
Whereas many and great inconvenience have happened to His Majesty's subjects of this kingdom by the differences of weights that have been of late made use of for the weighing of such foreign coin as is current here, and that several weights for the weighing of such coin as aforesaid have been unskilfully made, sold and uttered by John Cuthbeard of the city of Dublin (who was formerly appointed one of the persons to make them), to the great prejudice of his Majesty's good subjects; and we being desirous to remedy a mischief so prejudicial to trade and traffic of this kingdom, have thought fit by this our proclamation; and we do hereby declare that we have removed and discharged the said John Cuthbeard and Henry Paris from making, adjusting, or selling any money weights, and have directed all the money weights that are necessary for the said coin to be exactly made by Vincent Kidder of Dublin, goldsmith, according to the standard lately made in His Majesty's Mint in the Tower of London, each weight to be stamped with the number of pennyweights it bears, on one side and the king's arms on the other side, where the same are to be had at reasonable rates, not exceeding fifteen pence for all the weights, being

eight in number, viz.:– for the ducatoon, half–ducatoon, for the whole plate and Peru pieces, the half and quarter thereof, a twopenny weight, a penny weight, and a halfpenny weight, which are all that will be necessary for weighing the several sorts of the said coin which do now commonly pass in this kingdom ...

The proclamation goes on to state that no other weights were to be used, on pain of severe punishment and the only person allowed to make or sell money weights was to be Vincent Kidder. Kidder, a goldsmith made free in 1690, was fined in 1691 for working bad silver. He died in 1735.

On 27th August, 1697 (not the 17th as quoted by Westropp), Sir Francis Brewster reported from the committee for Trade that they had held a trial of several money weights made by Paris and Cuthbeard and the result of this trial was that the weights differed considerably one from another.

The House ordered that the aforementioned should be prosecuted for "their great deceit in making, selling and uttering false money weights". It was further ordered that they should be discharged from making any more money weights.

On 31st August, Henry Paris, in the custody of the Serjeant of Arms for making, selling and uttering false money weights, petitioned the House stating that he had made the weights according to a standard delivered to him by Mr John Cuthbeard, and if he was guilty it was only inasmuch as he had followed the standard imposed upon him by Cuthbeard (our italics.)

It was ordered that he should be brought before the bar of the House and there, on his knees, be reprimanded by Mr Speaker and be discharged upon paying his fees.

On 1st September Henry Paris appeared, was called before the House and there reprimanded. A petition of John Cuthbeard, in the custody of the Serjeant of Arms for making false and deceitful money weights, contrary to the standard, was read. He humbly apologised.

It was ordered that he should be brought before the bar of the House and there, on his knees, be reprimanded by Mr Speaker.

Worse, however, was to come, for on 15th September it was brought to the notice of the House that John Cuthbeard had, since the resolution of the house, uttered and sold false money weights in breach and violation of the orders of the House. The House ordered that he should be taken into custody at once.

On 20th September Cuthbeard petitioned that this violation had been due to the weakness and ignorance of his wife who had been prevailed upon in his absence to sell weights. He begged that he should not be punished for the mistakes of another. It was ordered that he should be discharged, paying his fees.

For a person such as Cuthbeard this must have been a considerable disgrace, he was a goldsmith, he held a captaincy in the Dublin Militia and had been Master of the Dublin Company of Goldsmiths. Who was guilty of what, and who was responsible? Was Cuthbeard merely guilty of selling variable weights that had been made by Paris, the founder? As the license holder he should have checked, but presumably had not, relying on the other. Was the prosecution perhaps instigated by Kidder who took over from him and was made Assay Master and Master of the Company of Goldsmiths in the same year? One can only wonder. It must have been galling for him to have held both of these offices and not have been maker of the money weights.

Cuthbeard died in 1705.

A proper review of British Coin Weights will appear in the next issue of EQM, giving a scholarly opinion on the book.

Italian Butcher's Scale

By D Crawforth–Hitchins

In the Art Collection of Christ Church, Oxford, there is a big painting 6 feet 4 inches by 9 feet, (190 x 271 cm,) in rich colours, by Annibale Carracci, who lived from 1560 to 1609. We publish it with the permission of The Governing Body, Christ Church, Oxford.

The painting was of a butcher's shop, with one customer in a vivid red shirt and leather trousers, propping his pike on his left shoulder while he fished in his purse for his money, waiting for his meat to be weighed. A woman stood behind the butcher, wrapped in a white head–shawl, with her hand reaching forward towards the piece of meat being held by an assistant in a black jacket. The assistant on the right, in a bright green shirt, was lifting a beef carcass from a hook, and the youngest assistant, in a red waistcoat and white shirt, was kneeling beside a dead lamb, about to dismember it on the floor. A grey dog skulked behind him, under the table, watching intently.

The focal point of all this industry was the burly figure of the butcher, dressed in white, calmly weighing the boned meat on his steelyard. It was a conventional iron steelyard with a fairly narrow extension to the blade, which roughly balanced the blade. The two hooks, used to hold the steelyard, were on swivels. As there were two hooks, it was a turn over steelyard. The counterpoise was brass.

As Carracci painted this picture between about 1582 and 1609, we can date the steelyard style to the nearest twenty–five years, a very useful piece of evidence.

N & Q 127	from Charles Mollan

I wish to know more about Irish scales. Few are in Irish collections, and details of Irish scales in foreign collections are inadequate. Can ISASC members provide details of any Irish scales, weights or makers?

Reply	from the editor

I agree that very little has been published about Irish scales and weights. As a result of your enquiry, I have compiled a list of all those for whom I have records. The resulting list, half of which is published in this edition of EQM, is interesting, but grossly inadequate. We have no chains of knowledge. Men appear to have worked in isolation, obviously an untrue implication. The competition from imports is unknown. The influence of London makers is unknown.

By publishing this primitive list, I hope that people will be spurred into action, and will either make more complete lists, or write to the editor with additions for inclusion in a supplementary list. All names and details will be forwarded to you, as you are the foremost researcher into Irish Scientific Instruments. (Alison Morrison–Lowe and John Burnett spent inordinate amounts of their holidays searching Irish documents in the 1980s, and their generous sharing of their findings have contributed greatly to the knowledge of Charles Mollan whilst preparing his book, and of Michael Crawforth whilst preparing Project Simon.)

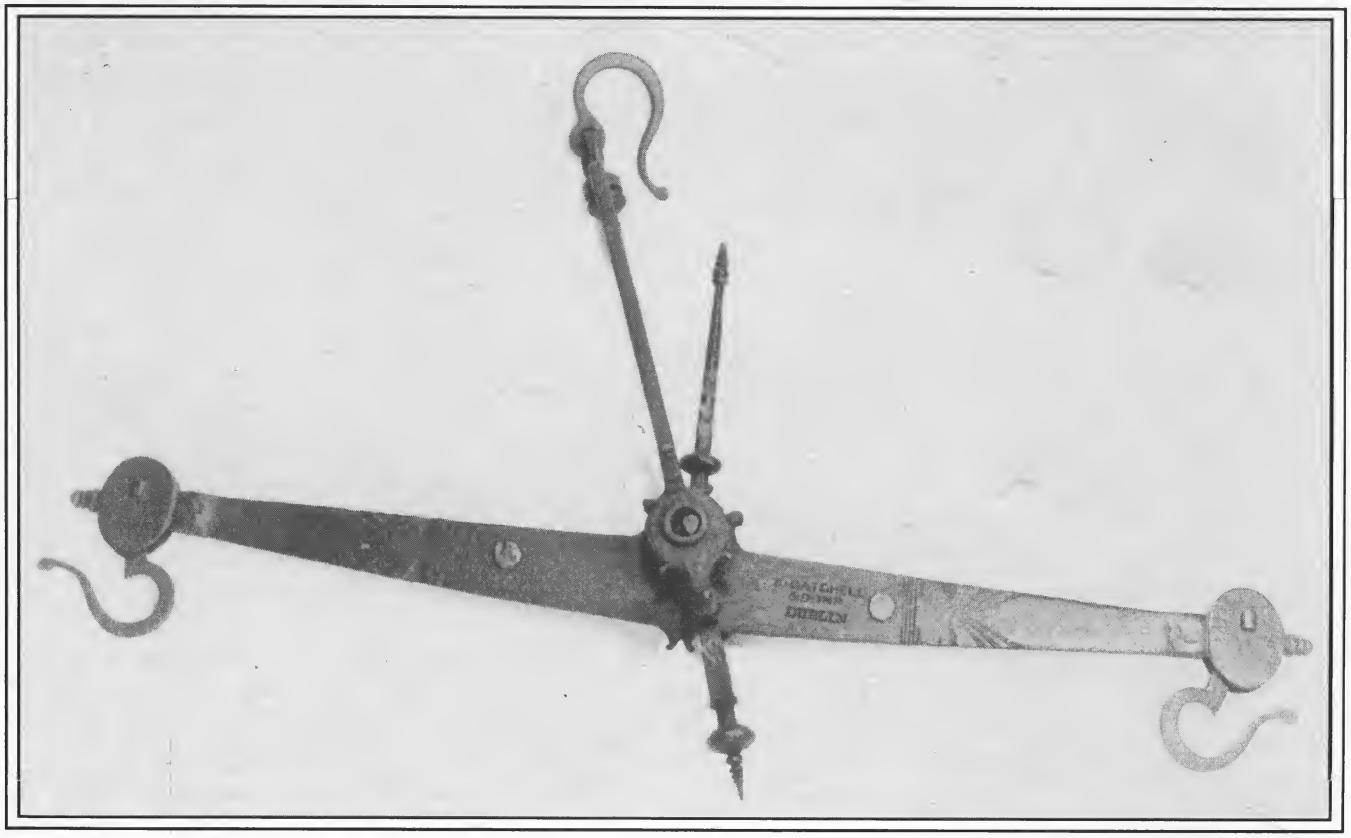
1776

ISASC

EQUILIBRIUM®

QUARTERLY MAGAZINE OF THE INTERNATIONAL SOCIETY OF ANTIQUE SCALE COLLECTORS

1994—ISSUE NO. 2 PAGES 1777-1804



PAGE 1778

Cover Picture

This trade scale by Samuel Gatchell and Sons is discussed fully on Page 1799.

English Colonial Scales

For Ireland? For the West Indies? By D Crawforth–Hitchins

Six sets of coin scales and weights survive of a type that puzzled Michael Crawforth for many years. Each set was made to weigh the silver 8, 4, 2 and 1 reale only. and the reales were categorised in English pennyweights and grains, not in Spanish or French deniers and grains, [so that an 8 reales was marked XVII or XVII½, and not XXI VIII as it would need to be in Spain or France.] Each set was made in about 1700 in London. For those unfamiliar with silver coins, the 8 reales coin had many names or nick–names, including the Ryal, Mexico Piece, Seville Piece, Pillar Piece, Piece of eight, 8 Reas, old Peru Piece, or Piastre of Spain.

We searched the literature but could find no clues, so we put the puzzle aside until new evidence could be found. Unfortunately Michael died before the new book, British Coin–Weights gave the first hints as to an answer. The Withers, in their chapter on Ireland, imply, by the predominance of those weights, that it was weights for silver coins that were needed between 1650 and 1702 in Ireland, not weights for gold coins.

In correspondence with Robert Heslip of the Ulster Museum, Heslip wrote, "*In the first half of the seventeenth century, the predominant foreign coins [used in Ireland] were Spanish 8 reales and fractions. Two reales of the Ferdinand and Isabella type were particularly common. The circulation seems to have been rather regional, with a concentration on the south–west. From the 1660s on, foreign coin became more widespread and probably more various, certainly with Portuguese, French and silver coins from the Low Countries supplementing the Spanish. Gold*

INTERNATIONAL SOCIETY OF ANTIQUE SCALE COLLECTORS

Founded September, 1976

176 West Adams St. • Suite 1706 • Chicago, IL 60603 • Phone 312/263-7500

EQUILIBRIUM is published quarterly in January, April, July and October.

Editor—Diana Crawforth-Hitchins 15 Hawthorn Ave, Headington Oxford OX3 9JQ, England

ISSN-0893-2883

Fig. 1. The first set. The paper label was added by a later owner in North America, after 1806. The box was made about 1700, in London, especially to take coin weights for the 8 and 4 reales, the silver coins minted by the Spanish in South America, but stolen in great numbers by the English, during their battles with Spain. 8 reales passed at 17 pwts in Ireland for over 50 years. Old Sturbridge Village Museum.

was extremely scarce. From the beginning of the eighteenth century silver flowed out (as it had from England,) and foreign gold came to dominate."

One set of scales survives that fitted this Irish need, kept in the Museum at Old Sturbridge Village in USA. See Fig. 1, but ignore the paper label stuck into the lid by a later owner, after 1806. The fruit wood box was of a style made in London between about 1690 and 1710, with book binders' stamps pressed into the wood, (just visible to the left of the label, and sticking out above the label to the left and the right, in the form of scrolls and flower buds in a bunch.) The use of two hooks on the lid was just beginning in about 1700 (instead of putting heavy brass straps and button catches on the front of the box, which was fashionable in the late 1600s. See Henry Neale's box on page 1801.) The knobbed weights, marked XVII and VIII 12G, for the 8 reales and 4 reales respectively, were located in holes cut precisely to fit them, with holes in the lid to take the knobs. (Apart from the six sets under discussion, no boxes of this period are known to exist, of London manufacture, for knobbed weights.) The beam was of the transitional style, made in about 1700, when the round section beam was first introduced. The pendant was large, as in the 17th century, and the cupids' bow in the centre of the beam, was still emphatically cut.

Being made in London, the obvious deduction is that it was to be used in London, but the silver coins used in London were not reales, but were English silver Crowns, Half-crowns, Shillings and Sixpences, for which there were simple round, flat weights and nesting weights. See Withers 1365-1380. [Please adopt the term "simple", not the term "home-made" as homes did not have dies for stamping numbers into metal.]

A second set may also have been made for use in Ireland. See Fig. 3. Shagreen cases were used in considerable numbers by 1726, (being listed in the inventory of Percivel Lamb,) but this case had earlier characteristics. The ply-wood was painted black where it was exposed. It was neatly lined with padded bright green silk in the lid, and with bright green velvet in the base. The cords and the balls at the top of the cords were in matching bright green silk. This particular shade of green was highly fashionable between 1690 and 1710, a date span that can be verified by checking the interior of the boxes of scientific instruments made by known makers in about 1700. The use of this shade of green died out by about 1715, so must be considered an excellent guide to dating.

The weights were lost, but the sockets were 26, 20, 16 and 14 mm in diameter, exactly the right size for surviving knobbed reale weights in other boxes. The doubts concern the exact mass of the reale weights that originally fitted the shagreen case. Were they XVII pennyweights, or XVII½ pennyweights? If the former, the case was probably intended for Ireland, but if the latter,

Fig. 2.

Author	Country involved	Date		Current weight	
Proclamation	Ireland	1674-1718		17	0
Badcock	England	1649-1660 (Published 1677)		17	12
Anon	England	1660		17	0
Newton	England	1700	Seville Piece	17	12
Newton	England	1700	Mexico Piece	17	10
Procclamation	American Colonies	1704	Piece of 8	17	12
Prior	Ireland	1729		17	12

the case was probably intended for some other colony. The actual coin did not have two masses in different places, but the mass at which it was legally reckoned to be worth full value was higher in one place than in another place.

The exact legal position is extremely difficult to determine, because various authors give different current weights for the same coin. The 8 reale's current weight is defined in Fig. 2.

Also, the weight at which the Government required the coin to pass at, may have been different from the weight at which the population was prepared to accept it. As Gibb stated in Money, *"the official exchange rates were not always followed in the market-place."* We do not know whether Badcock and the anonymous author in the list in Fig. 2 were referring to law or practice.

The third set had weights for the 8 reales passing at XVII½ pennyweights, (17 12) and can be dated to the period 1690 to 1706, because the maker, Weston Gowers, only worked for that period. See Figs. 3-5. He had already adopted the new style of beam, with the round section, and he used an exceptionally chunky centre, deeply cut away into an emphatic cupids' bow. He also used the modern round pointer with a fine collar at its base.

Fig. 3. The second set. A nesting set of Troy weights had been added to this case by a later owner.

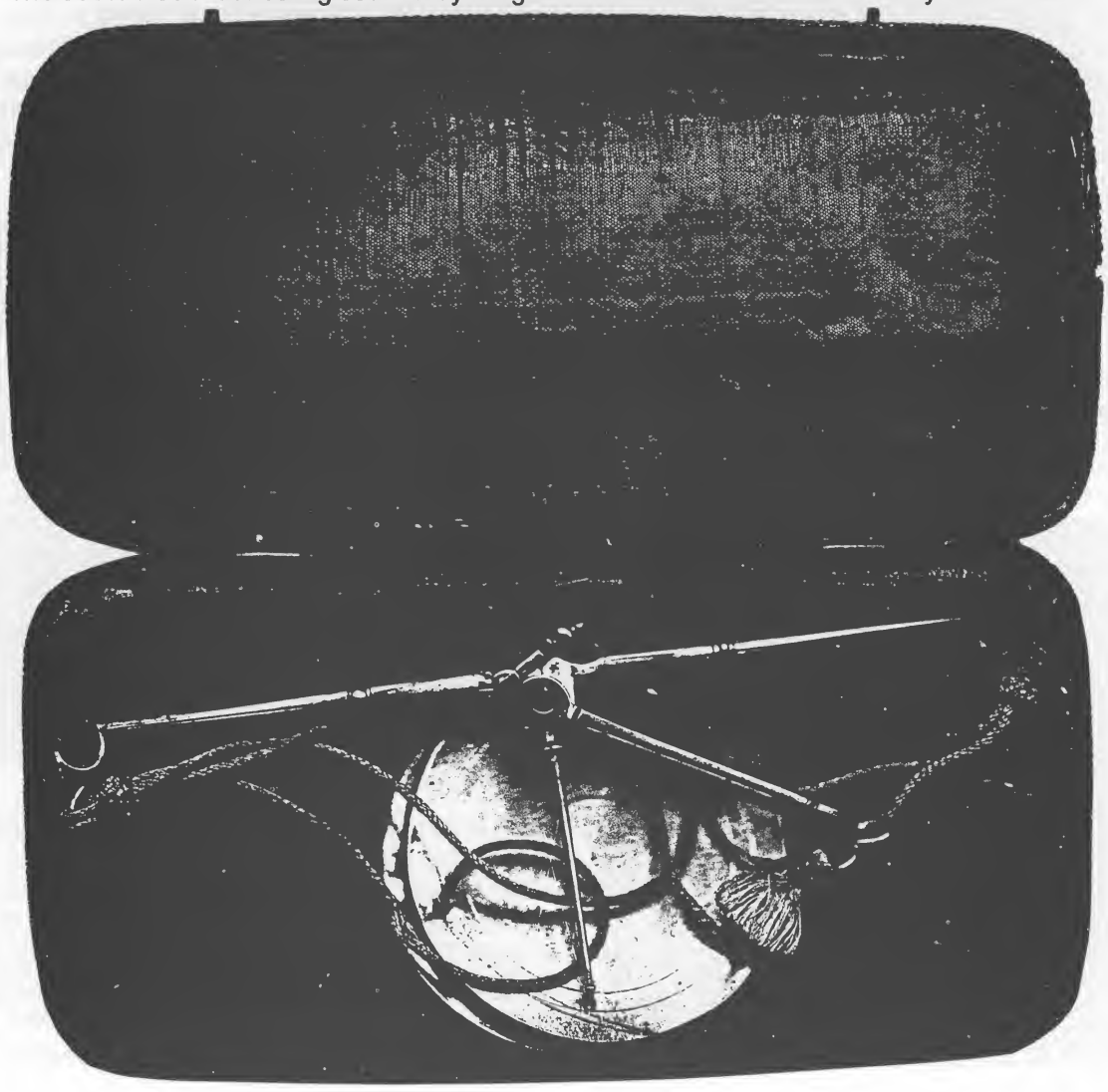


Fig. 4. Weston Gowers' label. Rood Lane was well to the east of most scalemakers' shops, up the hill from Billingsgate, where the fish market was held. Behind the left shoulder of the angel is an hour-glass, and behind her right shoulder is Death.

Fig. 5. The lid of Weston Gowers' coin scales, showing the classic hooks of the early 18th century. The book-binders' stamps all contained the same elements of scrolls and flower buds, in a roughly triangular bunch, but each box maker had his own precise design.

Fig. 6. The weights from the Weston Gowers box. These weights, with their knobs and rather crude stamps were totally unlike any other coin weights of the period, but all those surviving in these six boxes were virtually identical.

Fig. 7. A set of pennyweights and grain weights were stored in the central well, on top of the pans. They enabled the user to weigh any other coin that came his way, if he knew what the correct weight was for that coin. The grain weights also enabled him to ascertain the amount of metal 'lost', that is worn, clipped or sweated off the coin. He deducted 2 pence for every grain of gold lost, and 3 pence for every 24 grains of silver lost.

Comparing the label of Weston Gowers, (page 1782,) Ephraim Hand, (page 1801) and Henry Neale, (page 1381,) the similarities are striking. Ephraim Hand appears to have copied the label of Henry Neale. Ephraim Hand included the "Hammer and Crown" and the "Hand and Scales" symbols in the bottom centre of his label, which were on Henry Neale's labels because the Hammer and Crown was Neale's Guild sign and the Hand and Scales was the shop sign outside Neale's shop. Had Hand seen a box by Henry Neale that had been exported to Ireland and not understood the meaning of the symbols? Perhaps a Henry Neale scale with reale weights will turn up eventually. There was no recorded connection between Weston Gowers and Henry Neale in London, so the similarity between Gowers' and Neale's labels remains a mystery.

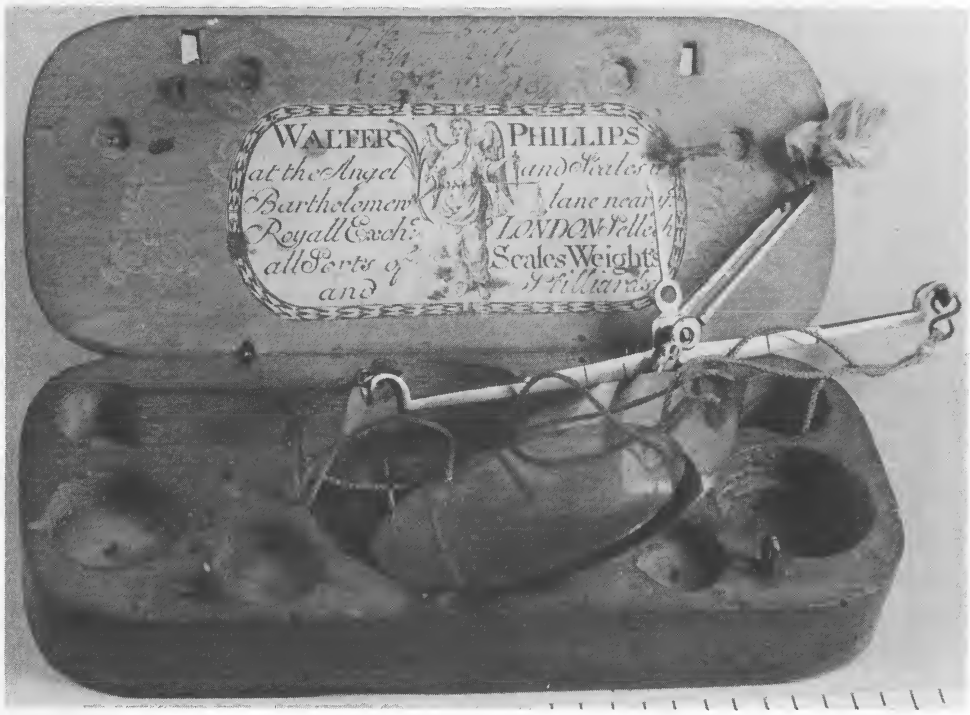


Fig. 8. The border round the margin of Walter Phillips' label will be familiar to any collector of early scientific instruments, because this over-lapping leaf design round an oval label was used by many makers between 1690 & 1715. Bartholomew Lane was a narrow street that went north from the Royal Exchange, where bankers & merchants met to do deals or obtain credit. Coin scales were needed there!

The fourth set (Fig. 8) was made by Walter Phillips, who worked from 1704 until 1719. He made the more old-fashioned beam, with square and keeled section, and a flat pointer with a pierced base. He made knobbed weights, like Weston Gowers, as the holes in the lid show clearly. All the weights are missing, but the note, written in manuscript above the label, (see Fig. 9,) suggests that Walter Phillips made his weights to the same standard as Weston Gowers.

Fig. 9. The country exchanging reales at this high rate has not been identified.

M S note	Explanation
17½ 5. 10.	[A reale weight of 17 pwt. 12 grains was worth 5 shillings 10 pennies.]
8¾ 2. 11.	[A reale weight of 8 pwt. 18 grains was worth 2 shillings 11 pennies.]
4 9 Gr1 5½	[A reale weight of 4 pwt. 9 grains was worth 1 shilling 5½ pennies.]
2 4½ 8¾	[A reale weight of 2 pwt. 4½ grains was worth 8¾ pennies.]

In the Irish Proclamation of 1695, the 8 reales was valued at 4 shillings and 10 pennies, and in 1701 it was to pass at 4 shillings and 9 pence, whereas in 1704, the Proclamation gave the value in the American Colonies at 4 shillings and 6 pence, and never to pass at above 6 shillings. The

value, in England, of the 8 reale coin seems to have fluctuated around 4 shillings and 6 pence right up to 1800. Complications arise if the value was being expressed in Irish money, without its being stated, because Irish money was worth slightly less than English money. Prior gave the value of the 8 reales as 4 shillings and 10½ pence, Irish, in 1729. The owner of this box used the higher weight and the higher value for the coin. Which colony used reales predominantly, used English pennyweights and grains, but passed the coins at a higher weight and value?

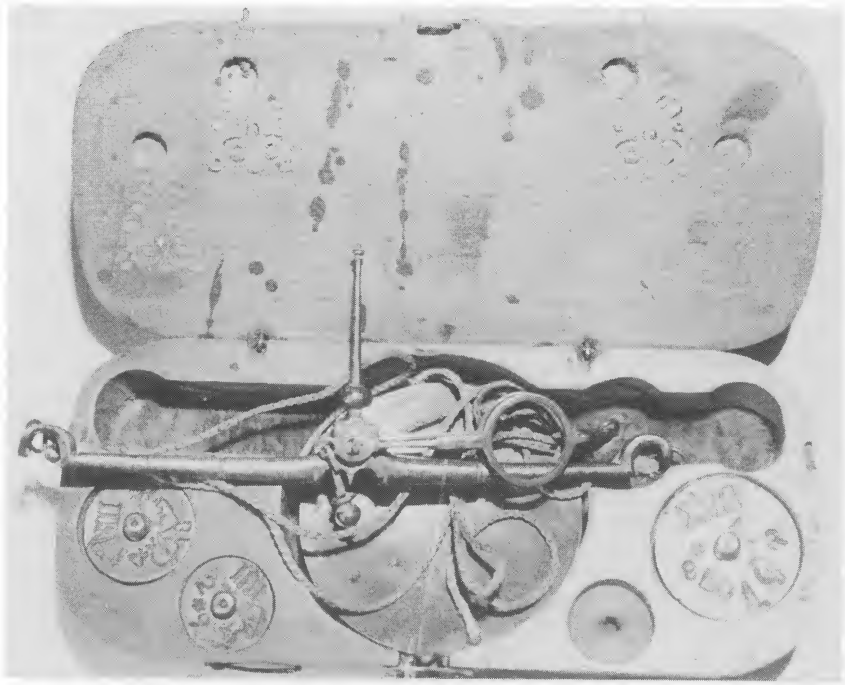


Fig. 10. The fifth set. The space where the one reale weight should go shows the standard method of construction of these cut-from-solid boxes. The fruit wood was drilled with bits of various diameters, then the straight channel was cut for the beam to lie in. If a grain locker was to be included, or a D shaped open pen, then a round hole was drilled, and enlarged with a chisel. The evidence was normally covered by silk velvet or silk brocade glued into the box. Originally, there would have been a trade label glued with cow gum to the lid of the box.

Fig. 11. The book-binders' stamp shows clearly. The 8 reale weight has been verified four times with contrasting marks, but the country in which it was verified has not been identified yet.

The fifth set (Fig. 10 & 11) can be dated by the book-binders' marks, used by London box-makers to decorate the lids. By comparing the tooling imperfections of numerous London-made examples, including Fig. 1, Fig. 5 and Fig. 8, the box can be dated to between 1695 and 1710. The velvet in the base was the vivid apple green so characteristic of the period, but the cords were, unusually, turquoise, the tassels on the cords were pink, and the tassel on the shears was red and cream.

The weights, again, have the higher mass, of XVII½, VIII 18 and IIII 9, (the smallest being lost.) They also bear various inspectors' marks that might help (if they could be identified,) in explaining where the scales were used.

The beam was of the transitional style, being round in section, with an abnormally high cupids' bow below the central pivot, a characteristic of about 1700. The unusually large knobs on the pendant and on the base of the pointer were also early characteristics of about 1700. The unique

feature was the sight–hole shears, with the box cut away to allow room for the large circle. This is, by far, the earliest example known of a coin scale's having a sight–hole shears.

The sixth set was in a shagreen case, but with the incredibly rare survival of the trade label. (Usually the label was so lightly glued to the silk that it fell off and was lost, or it was held onto the silk by a pin which rusted and was removed by the owner.) The label was that of Walter Phillips, maker of the fourth set, and the weights survive. It had four round knobbed weights for the 8, 4, 2 and 1 reale, but details were not recorded of the mass, so we do not know whether the set was for Ireland, with weights of XVII pennyweights, or the mysterious other colony, with weights of XVII½ pennyweights..

With thanks for their assistance to Sjoerd Bruinsma, Robert Heslip, Jaap Visser, Lewis Weiss, Samuel M Wilson and Paul Withers. Any further evidence that will help to solve this mystery would be gratefully received by the author.

Bibliography

W Badcock	A Touchstone for Gold and Silver Wares, publisher not recorded, 1677.
J Ede	Gold and Silver Coins, London, 1808.
J Gibb	Money from Cowrie Shells to Credit Cards, British Museum pub, London, 1986
P N & H Schiffer	Brass Book, 1978.
Simon	Irish Coins in Ireland, Dublin, 1749.

Walter Phillips

by D Crawforth–Hitchins

A short biographical note adds to the interest in Walter Phillips. He was born in about 1682, son of Charles Phillips of Stockton, Herefordshire, agricultural worker. He travelled 110 miles east to be apprenticed to John Ben in London on 2nd July, 1696. He was trained for eight years. Blacksmiths' Company had to make a special dispensation for him to be freed without the consent of his master. *"Walter Phillips, apprentice of John Ben, now at sea, with consent of his mistress* [John Ben's wife,] *now present, and upon testimony of Capt. Snart,* [John Snart, scale–maker and captain in the Militia,] *and William Taylor,* [blacksmith with a huge business,] *of this company, admitted and sworn 1 June 1704."*

Walter Phillips prospered, being made a member of the Livery in 1714. In 1716, he claimed on his insurance because he had a fire. The Union Fire Office paid him £1..10 shillings in compensation.

He took three apprentices including Henry Oven, (later a master scale–maker,) and Joseph Moore. Joseph had started his apprenticeship with John Picard, but had to be transferred to Walter Phillips when John Picard went mad and was incarcerated in Bedlam, the Bethlehem Hospital for the Insane. Joseph Moore must have felt that the Fates were against him when Walter Phillips died before he finished his apprenticeship, and Walter's widow, Elizabeth, had to consent to his freedom in March 1723. There was an error made by the Clerk of Blacksmiths' Company in recording this. He wrote that Joseph was freed *"with consent of Elizabeth, relict of said Picard,"* but (a) John Picard's wife was called Ann, and (b) John Picard was not dead in 1723, so could not have left a relict. The Clerk meant "Elizabeth, relict of said Phillips."

Forty years old was young for Walter Phillips to die. Statistics give the impression that most people died at that age, but that is misleading. If a child lived beyond the age of five, then he could expect to live into his 60s or 70s. Most scale-makers worked for 35 to 40 years.

Elizabeth Phillips continued the business, taking on an apprentice, William Newton, (later a master scale-maker,) in 1722, with full permission of Blacksmiths' Company, because she was official owner of the business. William was turned over to Thomas Overing in December, 1723. No more is known about Elizabeth Phillips' attempts to run the business.

Review

R B Bate of the Poultry, 1782-1847, the Life and Times of a Scientific Instrument Maker, by Anita McConnell, published by the Scientific Instrument Society, London, 1993. Available from the SIS or from ISASC at £7.50 plus packing and postage, of 75p for Britain, £1.20 for Europe and £2.20 for the rest of the world.

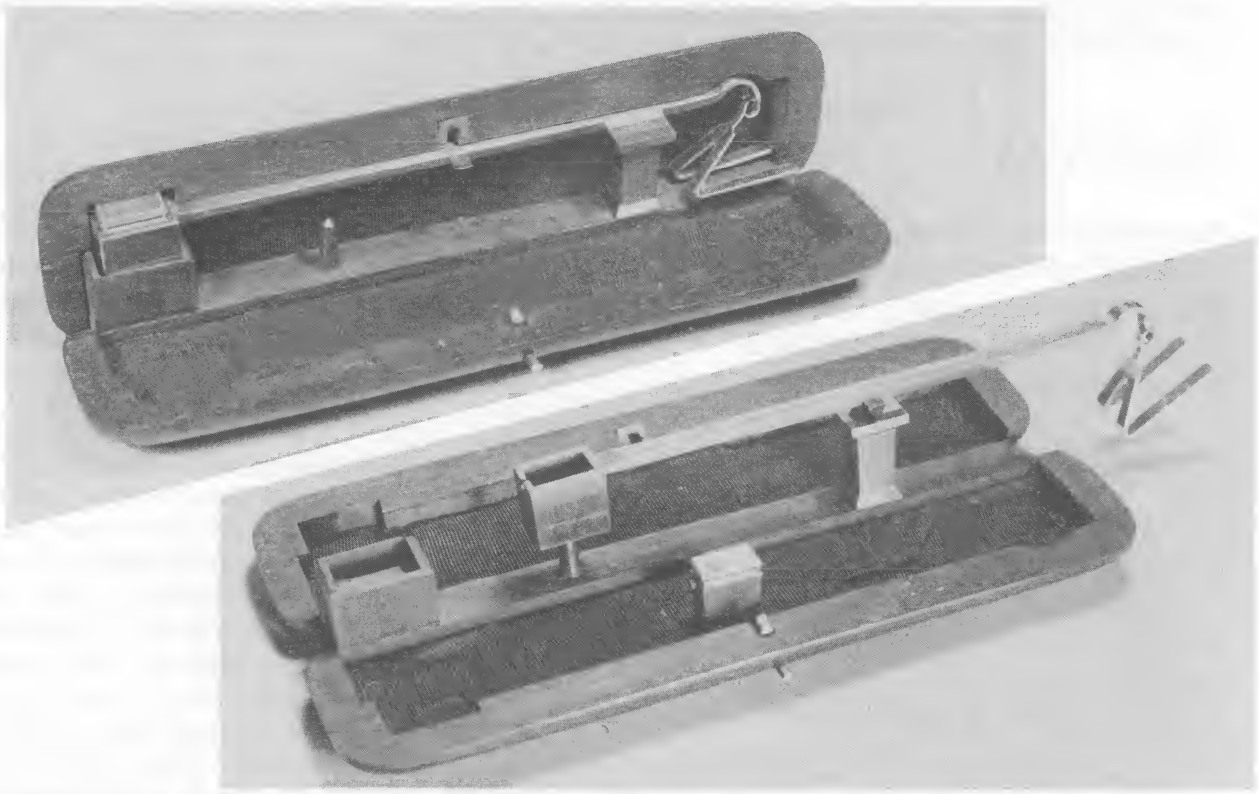
This paperback has 81 pages, 13 illustrations, a family tree, and numerous quotations. It is a thorough resumé of the trading practices of Robert Brettell Bate, giving a lively insight into the way contracts were handled between the Inland Revenue, (with its Board of Excise,) the Admiralty, (with its Chart Agency,) and individual makers and suppliers. The underhand methods, the libellous statements made, the passionate denunciations, the skulduggery and the financial risks they took are amazing. No wonder Bate had periods of mental instability. Most people would have had a full-blown nervous breakdown.

Through all the business pressures Bate built up his scientific knowledge and his practical skills, surrounding himself with reliable workmen so that he could take on work that demanded abilities at the limit of technical know-how. He undertook to supply Standard Weights and Measures, but then had to overcome the problems. He was initially supplied with spongy castings, and his balances were not rugged enough to take the great weights involved while remaining sensitive. The thermometers needed to divide each degree into ten parts and had to be made especially for the task. He had mathematical problems arising from the paucity of old Standards to which he could refer. Fortunately he had Kater as a sympathetic and knowledgeable go-between, helping him to sort out the problems and preventing the Treasury's disapproval falling on Bate.

He had to pay for all materials, tradesmen's work and business expenses for the three years that it took to do the work, then was refused payment by the Treasury, who objected to his allowing himself a handsome salary. Bate's letter to their Lordships, about the arduous nature of the work and the long hours devoted to it, to the exclusion of his regular business, brings tears to the eye. After arbitration, he barely covered his costs, and certainly received no salary. Why his firm went on working for the Treasury, albeit at a reduced level, is hard to comprehend.

My emotions went up and down like a yo-yo whilst reading this book, perhaps because McConnell lays out the bare facts only, leaving the reader to empathise with Bate or with his trading competitors, and to enter, in imagination, the world of men who earned only when they could convince bureaucrats that they had the most efficient instruments, the lowest costs, and the most reliable supply lines.

Fig 1. *"Cotton's Pocket Balance for Sovereigns Made by R B Bate, 21, Poultry, London. Design Registration no. 229, 30th July, 1844."* This steelyard is shown full size, firstly, packed into its rosewood case, and secondly, with the fulcrum knife placed on the little "table" or plane, and the poise delicately set onto the pin, to prevent its toppling off. The poise has a neat depression centrally drilled underneath, to locate the pin accurately. As it is shown, it was used to weigh the half sovereign. If the rectangular block is replaced into the poise, it would weigh the sovereign. As there was no means of checking the amount of gold lost, it was only intended as a go-no go scale, informing the user only whether the coin was full weight, or a blatant counterfeit. William Cotton may have been an excellent Chairman of the Bank of England, but he was not a practical designer. Attempts to place a coin on the hanger usually result in the coin's disappearance on the floor, the beam's skidding off into the case, and the user's swearing and feeling foolish. Attempts to shut the box fail because the coin plate swings out of the box just as it is being closed, giving the user more grounds for humiliation. As a toy it is charming. As a tool it is a failure. The instrument is not marked in any way. Bate made it beautifully, but we only know that he made it because the drawing, kept at the Public Record Office with the other Design Registrations, is so labelled. No other Design Registration drawing mentioned the maker.



ISASC members will find many familiar names of men who worked for, were associated with, or competed with Bate, such as Henry Kater, E W Ladd, Ludwig Oertling, John Field, Robert Neill, J D Potter, Bartholomew Sikes, Matthew Berge, M DeGrave & Son, Young & Son, Dring & Fage, Holtzapffel, William Simms, Joseph Long, T C Robinson, Edward Troughton, Thomas Sanders,.....The connections are clearly explained, the cross-fertilisation of ideas discussed and the problems of proof laid out for us.

Pages of Bate's account books introduce us to the specialist workmen, without whom the industry would have struggled, men like Bennett who made stands, Corless who made callipers, the London Plate Glass Co, J Thompson who drilled holes, G Burrows who supplied agates, R

Howard & Co who made tin beams, George Dollond who supplied brass boxes, J F Drury who made plaster patterns..... The interlocking trades hint at how industry shared the work.

Obviously the chapter on Weights and Measures is the most relevant to ISASC members, but just as much pleasure can be gained from the chapter on hydrometer making. The chapter on all the various instruments with Bate's name on, (that may well have been made by other makers,) is thought-provoking, but needs more research to be done, which will take many years to compile. I commend McConnell for getting the work published, and not using the excuse that she needed to wait until more evidence was collected. One instrument that escaped her notice was the sovereign balance shown in Fig. 1 but there is enough in this book that is new, or needed pulling together, to satisfy the interests of all readers.

The only thing to deplore is the publishers' decision to publish so few copies of this exciting little book, as they are limiting the number of people who will be able to incorporate this knowledge into their picture of the first half of the 19th century in London. I recommend this book wholeheartedly and warn readers not to delay ordering their copy. D F C-H

Review

Shire Album 44, **Weights and Measures,** by J T Graham, revised by Maurice Stevenson, published by Shire Publications Ltd, Princes Risborough, 1993. 32 pages, 36 b & w photos, many of several weights, 129 old verification drawings, the official stamp numbers, further reading list and places to visit. ISBN 0 7478 0226 2. Price £2.25 plus postage and packing. Available from ISASC.

Fig. 1. A photo from Shire Album 44, labelled '*An iron pie-shaped weight, a registered design of 1847. Note the rejection star on the copper plug.*' David Green succeeded to the business of I & D Green in 1828. He ran the iron foundry at Coseley Foundry at Sedgley, Staffordshire until 1854. He made iron bar weights for normal heavy trade use, as well as this charming design, presumably intended for use on a shop counter, where customers would be suitably impressed by the retailers' smart weights. The foundry cast many other products, such as sad irons and grates.

How nice to see a revised version that corrects the little mistakes of the 2nd edition. The book is, and always has been, a useful introduction to British Weights & Measures, with good photographs. There are 14 pages on weights, and 5 pages on volume measures. Measures of length and area, temperature and specific gravity etc. are not covered. As with every reference book, a few alterations would make it even better, but it would be querulous to mention them. Buy this pocket book and use it with confidence. Keep it with Norman Biggs' book *English*

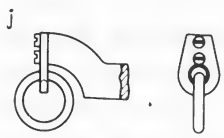
Weights, Gerard Houben's book *The Weighing of Money* and the *Inventaire des Poids* of the Musée National des Techniques and you have the basis of an economical library on weights.

Shire Album 55, **Scales and Balances** by J T Graham, revised by Maurice Stevenson, published by Shire Publications Ltd, Princes Risborough, 1993. 32 pages, 36 b & w photos, 6 drawings and diagrams. ISBN 0 7478 0226 2. Price £2.25 plus postage and packing. Available from ISASC.

The reason that these books are being reviewed yet again is because of this volume. Some of the more dubious parts of the 1st edition have been kept in this edition, unfortunately, making this volume less reliable.

The Oertling in the photograph on page 7 was probably made in about 1880, but, being a Model 1, it might have been made as early as 1850. The reference to detachable knife-edges is a little misleading, as the knife-edges were of the type shown in Fig J on the opposite page, a style possibly learned by Oertling in his youth in Germany. They were detachable plates screwed onto the end of the beam with sharpened planes in the bottom of each hole, **not** knives that were slotted into the beam laterally. The end bearings were semi-relieved, as they rested lightly on the box when not in use.

Fig. 2. An illustration from Shire Album 55, with its caption. Little is known of Oertling's early training, and doubt about what he was doing between about 1840, when he arrived in England, and 1846/7, when he started making balances. Some light may have been cast by McConnell, in her book on R B Bate.



GERMAN SWAN-NECK PIVOT,
Detachable Steel. c 1880-1890

Dating from about 1880, this beamscale is by Ludwig Oertling, originally a German scalemaker. There are detachable knife-edges and a flat centre bearing which is relieved.

The first paragraph of Collecting Beamscales leaves me gasping. *"Dealers sometimes offer made-up assemblies with parts not matching and these are never worth buying, at any price. Other points to look for include chipped knife-edges or agate bearings and cracks in the beam near the indicator. Bearings are sometimes missing from inside the shackles. On smaller beamscales wire is sometimes substituted for shackles or knife-edges. Cracked pottery or glass pans should only be accepted if the buyer is desperate."* Was the author in league with the Art as Investment brigade? He sounds prepared to discard 80% of ISASC members' collections with all their imperfections, in the name of neatness. All that history, all that evidence thrown away for want of a bearing or a pristine pan! We are not intending to *use* the scales, we want to learn from them, enjoy them, compare them, see the history of our cultures and touch our past. We know that history has left its mark on them but we can get satisfaction from what is left.

The statement that *"wooden boxes containing beamscales.....first appeared in the late seventeenth century"* is wrong by some hundreds of years, and *"made-up boxes date from the mid eighteenth century"* would be more accurately put back about 30 years. Shagreen boxes were *not* oval but rectangular with rounded corners. Apothecary boxes *always* contained scruple weights as well as drachm weights when they were new. *Not* all small coin and apothecary scales were hand-held, as some boxes contained a neat pillar that could be pegged into the box.

Class I, II and III are defined in this edition, but Avery's are still credited with starting at the end of the 18th century, instead of 1816. It is nice to see a bread scale on page 11 with a full set of weights, allowing the user to weigh the bread, not just indicate whether the loaf was over or under the desired weight, as was more normal with bread scales. I also like the bread scale on page 12 with its pristine tin box, as most collectors have had to settle for a bread scale either with a dilapidated box or without a box. See Fig. 3.

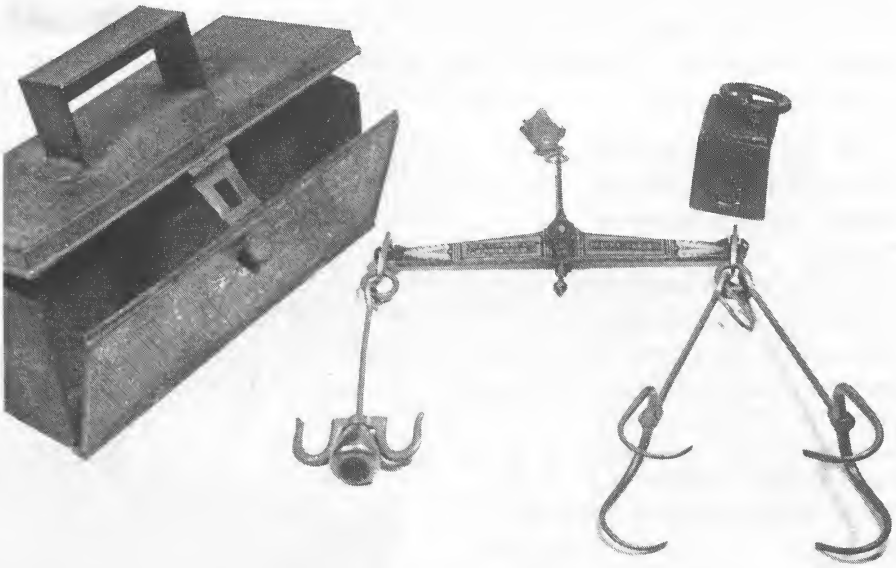


Fig. 3. A photo from Shire Album 55, showing a W & T Avery bread scale. The iron beam was beautifully hand-painted, over the black paint, with gold leaves and lines, picked out with scarlet lines. Instead of a tassel, these heavier beams had a leather tab by which to hold the shears. The tin box opened down at the front, as well as having a hinged lid.

The hooks with the yarn balance on page 13, were not precisely to balance different weights of thread, To quote John Nesbitt *"To test samples of Cloth double the size of the templates, the hook S is suspended from the hook D [the thicker wire hook attached to the left-hand end of the beam,] proceeding afterwards to obtain the counts in the usual way. To test fine Yarns, from 100s, place the long hook U on the hook A [at the right hand end of the beam,] then add a sufficient number of threads to bring the beam to a horizontal position, and multiply the number by ten.....The small hook S may be used to test the balance, by placing it on the hook A. The beam should be parallel with the right side arm of Pendulum.."* This design was patented in England by Emil Staub of Germany in May, 1886, in a modified version with a large chart behind the beam, in October, 1889 and yet again, with another chart design, in June, 1890!

The comment on page 13 that *"lighter, longer beams [were sought] to achieve optimum accuracy and sensitivity"* was only true until about 1880. The short beam, of about 4 inches (100 mm] was tried in about 1866 by Bunge and almost immediately, Continental commercial manufacturers realised that short beams were better. By 1900 the long beam was almost obsolete, and by 1914, Oertling had abandoned them completely. The balance in the photograph on page 14 is normally called an Optically *projected* balance, for obvious reasons. The air-damping drums are most noticeable, and deserve a comment, if only to point out that they became common at the same

time as optical projection in the late 1940s. This balance may look like a laboratory balance, but it was made for inspectors of weights and measures.

The slightly derogatory attitude taken by the author to the assay balance on page 15 perhaps fails to take into account that the balance was made in the 19th century. Yes, only the centre knife-edge was relieved, but it had rests to take the weight of the solid beam when it was not in use. That was adequate for the use to which it was put.

The comment on page 16, that *"Except for inspectors' instruments, balances rarely carry any stamp or means of dating."* seems to overstate the case somewhat, when one thinks of David Koritschoner, Day & Millward, DeGrave, Short & Co, R B Bate, Young & Son, Baird & Tatlock, E Bertin, Cook, Troughton & Simms, James Crichton, Doyle & Sons, Griffin & Tatlock..... Another strange comment follows the previous one, that *"One firm, L Oertling, like W & T Avery and DeGrave Short & Co well known for their balances, became Limited in 1919."* Oertling became a limited company in 1880, W & T Avery became limited in 1891, and DeGrave in about 1906.

Page 18 shows the lovely Avery bread scale that was patented in 1885, and was initially made of brass. However, by 1898, Avery's made two versions of the scale, of iron or of brass, and added a bracket reaching from the shears over to the tip of the blade, so that the tip could not drop suddenly when the loaf was removed. As this one lacks the bracket, the date might be more accurately stated to be prior to 1898.

The use of the auncel was condemned, as stated, in 1429, but it was the user who was excommunicated, not the auncel that was cursed. I like the explanation of the differences between the steelyard and the bismar, which needs such clear spelling-out. As for *"the turn-over steelyard dates from the late 17th century,"* remark, any reader who looked at the Annibale Carracci painting shown on page 1776 of EQM, knows that they certainly predate 1585, the probable date of the painting. The four-sided steelyards that Graham refers to, were used for grain scales in the Low Countries. The photograph at the top of page 21 shows a steelyard that might have been made by William Waddy, but equally well, might have been owned by William Waddy. The lower photograph looks more like an early W & T Avery steelyard, having the ill-defined triple-lobe at the left-hand end, where Thomas Beach normally used a single, well-defined lobe, as shown in his catalogue, (shown on pages 1543 and 1544 of EQM,) along with a large disc at the right-hand end. Of course, Avery's museum have many examples of Beach's work, and may disprove these remarks.

On page 22, an early self-indicating scale is shown. This design was not offered in the 1912 catalogue, but was in the 1916 catalogue, without any comment as to its novelty. I would suggest a date of about 1914 for its introduction into Britain from America.

There is an implication, on page 22, that Roberval **scales** were first developed in France, where an unequivocal statement that they was first developed in Britain would be helpful, (they were called English scales in France.) Accelerating beams do not seem as rare as the author suggests. As stated, Beranger improved the Roberval, but the patent was taken out in 1847, and was rapidly put into production.

For the argument about cased weights, which arose when this book was first published, read EQM pages 355, 418-419 and 422-424. It should not be necessary to reiterate the evidence. Cased weights were used for *some* postal weights of 4 oz upwards, but scarcely ever for smaller

weights. The chances of all the weights on the postal roberval's being cased are remote. The smaller set of scales in that photograph have come out of a larger piece of furniture.

Hall's patent (goose-neck? That is one I have not heard!) was taken out in 1863. It was made, with variations, for many years. The bell weight and cord are entirely irrelevant, being there merely to replace the lost letter clip. What a pity that it was not air-brushed out of the photograph.

It is difficult to accept the remark that *"without some other indication the lack of information [about postage rates] presupposes manufacture after about 1915, when postage rates altered much more rapidly."* No collector of postal scales would date their scales to after 1915 on such inadequate grounds. Graham did not mention bismars, moving load scales, and the odd weight-lifting steelyard. Joseph and Edmund Ratcliff would not appreciate being welded into one J E Ratcliff and it is strange seeing postal robervals being called "small counter machines," with the connotations of shop scales. Perry & Co were retailers, but not makers of scales, as far as can be ascertained.

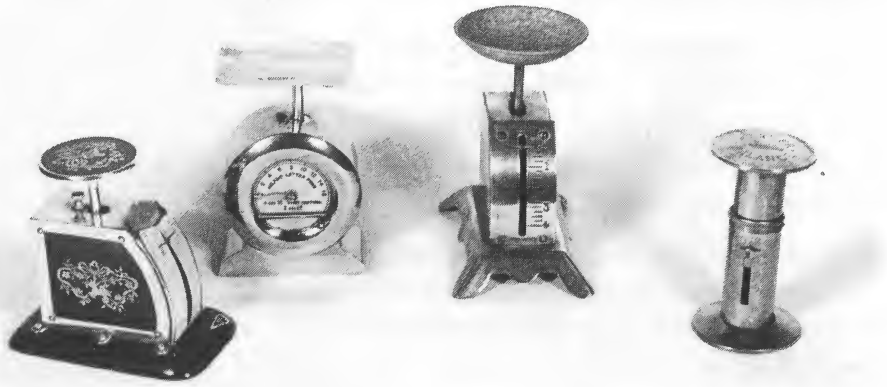


Fig. 4. Another illustration from Shire Album 55. Bow-front spring scales were patented by E N Gilfillan in 1890 in USA and in 1896 in Britain. They became very popular by about 1920, being cheap, effective and easy to use.

The photograph at the top of page 27 shows two half-roberval and spring scales, not *"spring and pendulum lever"*, a brass egg scale and a tin candlestick made by Criterion after 1928. Candlestick postals were registered in 1840, by R W Winfield, and were rarely made after the change in postal rates in 1871.

Jacobus Neusts worked in Antwerp, so it seems more appropriate to call him a Low Countries maker, not a Dutch maker, in view of the politically complex history of that part of Europe. The comment on rockers that *"Some specimens on sale today look suspiciously new."* is suitably cautious, but I am of the opinion that many of these rockers were pushed into a drawer and forgotten, only to be sold in original condition, today.

The remarks above may seem overly critical for a small pocket reference book, but every disagreement has been aired to help readers to use the book successfully. It is a plea for accuracy with brevity, precision, when it costs no more than woolly remarks, and for knowledge to be included where there is space for it, and details to be highlighted when they add interest.

The book is still packed with useful information, with interesting photographs showing a great variety of types of scales, and has good lists of books to read and places to visit. Considering how much we usually have to pay to learn about metrology, this is a bargain and should be on every collectors' shelf.

D F C-H

With thanks to Barry Oliver for his assistance.

REVIEW ARTICLE

by Norman Biggs

British Coin-Weights: A Corpus of Coin-Weights Made in England, Scotland and Ireland for Use in Britain, by P. & B R Withers, Galata Print 1993. 368 pages, oversize A4. ISBN 0 9516671 1 4. See EQM page 1770 for prices.

The publication of this book marks a turning point in the study of British Coin-Weights. It may rightly be regarded as the culmination of twentieth-century research. Furthermore it will surely be the cornerstone for future work in its field, and a very useful reference for work in associated areas.

The study of coin-weights is an interesting and, in some ways, a difficult subject. It is interesting for several reasons. The use of coin-weights spans almost the entire period during which gold coinage was widely used, in particular, the European experience from the introduction of the florin in the thirteenth century to the Great War. The story of coin-weights mirrors the ebb and flow of trade, national and international upheavals, and the perennial problem of maintaining a *'sound'* currency. The study of coin-weights is difficult for just the same reasons. Neither a purely coin-based approach nor a purely historical one can begin to illuminate the true picture. In addition, there are the usual difficulties of method and interpretation associated with any form of metrological enquiry.

The complexity of the subject may explain why it was not until 1909, in the 6th volume of the British Numismatic Journal, that we find the first attempt to discuss English coin-weights. (Although several articles on coin-weights were published in France and Belgium in the second half of the nineteenth century, they did not discuss the English series.) The author of the 1909 article was L A Lawrence, a leading numismatist of the time. His paper was based on evidence culled from Ruding's Annals of the Coinage, and the study of a small accumulation of weights which he had put together in the course of his numismatic researches. These weights are now in the British Museum, where the collection has grown enormously since Lawrence's time.

While crediting Lawrence with the pioneering work in the subject, it is impossible to overlook the defects of his account. His artefactual evidence was curiously unrepresentative, and his reliance on Ruding for documentary evidence meant that he completely missed some important chapters in the story. For example, there are no official documents referring to the extensive circulation of portuguese gold coins in England in the middle of the eighteenth century, because the authorities were embarrassed by it. As Snelling says, the gold coin of Portugal *'passes only by courtesy, and not by law'*. However, what happened in Ireland was a different matter, and the authorities found it acceptable that foreign gold of any kind should circulate there. Indeed, several proclamations regulating the value of foreign gold in Ireland were issued. This led Lawrence to believe that coin-weights for Portuguese coins were all intended for use in Ireland. In fact, ample evidence that the weights were intended for use in England is provided by the makers' labels affixed to English coin scale-boxes of the time, and many other contemporary sources.

Despite its shortcomings, Lawrence's paper aroused some interest in the subject. When it was read to the BNS a few members of the Society exhibited coin-weights, and several others contributed to the discussion which followed. Further publications on the subject soon appeared. In 1916, Sir Hercules Read, vice-president of the Society of Antiquaries, wrote about a very ornate (and quite untypical) box of scales and weights, and around the same time M S Dudley Westropp read a paper on Irish coin-weights to the Royal Irish Academy.

The next steps were the result of the foresight and initiative of Thomas Sheppard of the Hull Museum, a fellow of the Society of Antiquaries and a member of the BNS. He began to form at Hull a collection of coin scales and weights which soon became the finest in the land. He spoke about the subject at the British Association meeting in 1918, and in the years 1920-23 he published many details of the Hull collection in the columns of Spink's Numismatic Circular. These articles were collected in a book, which also contained an extensive listing of weights compiled by Sheppard's colleague, J T Musham. For the last seventy years this book has been the primary source of information for students of English coin-weights and scales. It was reprinted in 1976, and soon sold out, so that second-hand copies of the reprint are now much sought after.

There are at least two mysteries associated with Sheppard and Musham's book. The first is the question of the missing plates. The preface and the list of illustrations for the original edition indicate clearly that four plates of coin-weights were to be included. But the book has no plates. Presumably the expense of producing them in 1923 could not be justified, which is a great pity, because there are some items that we should dearly love to see. The pity is the greater because the collection at Hull was lost when a bomb scored a direct hit on the Museum in the war of 1939-45. But therein lies the second mystery: what really did happen to those coin-weights? It is possible that an intense fire could have destroyed them, quite literally, but there have been rumours that some or all of them may have survived. It has even been suggested that they were officially recovered and transferred to another museum, without any record being made in the excitement of the time. The only certain thing is that the rumours will persist!

Apart from the collection at Hull, several other collections of coin-weights were being formed in the 1920s and 1930s. The collection now in the Ashmolean Museum appears to be based mainly on two private collections formed around this time, one of them by F P Barnard, the author of the standard work on reckoning counters. Probably as a result of the nineteenth century work on the subject in France, the Bibliothèque Nationale already had a cosmopolitan collection of coin-weights, including a good selection of English ones. Unfortunately, when Dieudonné wrote up the collection in 1925 he classified the weights according to the coins which they were intended to check, a method which obscures much of the historical context and economic significance of the material.

The collection of W V Morten is mentioned several times in Sheppard and Musham's list, but nothing more is known about Morten or the fate of his collection. A better-known collector was V B Crowther-Beynon, President of the BNS in the 1930s, who published two articles on the subject in the BNJ. In the second one (1931) he refers in flattering terms to one other private collection, and mentions three *'considerable collections'* which he had recently acquired himself. After Crowther-Beynon's death, his collection of weights passed to the British Museum, together with a number of scales and three manuscript note-books. These materials form the backbone of the current holdings at the British Museum.

Also in the 1930s, there was being formed the important collection of Richard Turner, sometime Mayor of Bedford. In 1936 he wrote an article on coin-weights, illustrated by two plates of photographs, for 'Eagle', the magazine of Bedford Modern School. Later in his long life (1881-1982) he contributed articles to 'Libra', the journal of the History Circle of the Weights and Measures Administration, and for many years he was regarded as the leading expert on the subject. After his death, his collection was dispersed, partly by private sale, but mainly through two auctions held by Boardman's of Haverhill in 1986. The entire collection may have included as many as a thousand 'loose' weights, as well as numerous boxes of scales and weights. Although its dispersal was regrettable, the availability of a good number of highly desirable pieces helped to sustain the growing interest in the subject. This process had in fact begun in the 1970s, when Seaby's listed a selection of coin-weights in their Bulletin on several occasions. There were also two substantial collections auctioned at Spink's (1979, no.7 and 1981, no.18.)

The continuity of scholarship provided by Turner led others to take an interest in the subject, many of them from outside the mainstream of numismatics, and several from outside the UK. Thus, in the 1960's and 1970's, there were useful publications written by a number of people. Among them were, in no particular order: Ronald Stocks, Graham Dyer, George Mallis, Gerard Houben, Michael Crawforth, and Francis Lavagne. But at the time when the author of this review became interested in the subject (around 1982), the book of Sheppard and Musham was still the most comprehensive account available.

In an attempt to establish an historical and economic context for the entire sequence of English coin-weights, the reviewer wrote a series of nine articles for EQM, This journal had already carried a number of articles on coin-weights, coin-scales and associated matters. The nine articles were published in the years 1986-88. As one critic was not slow to remark, these articles are 'diffuse and incomplete'. The intention was to lay the foundations for a more extensive study, and indeed the first part of that project was carried through, with the publication of a detailed study of the medieval period in the 1990 volume of the BNJ. Further work was held over when it became known that Paul and Bente Withers had undertaken the mammoth task of photographing and cataloguing all the British coin-weights which were accessible to them. Clearly, any future work on the subject would have to use their tome as its primary source of artefactual material.

The publication of the book is thus a very welcome event. Indeed, it is everything that one could expect, being substantial (360 large pages), comprehensive (over 2500 weights are included), well-illustrated (there is a high-quality photograph of every weight), and informative (documentary evidence and illustrations of coin-scales are liberally scattered among the descriptions of the weights themselves.) Above these minor virtues is the major one: as the subtitle states, that it is truly a Corpus of British Coin-Weights. So, like all good research work, it opens the door to future work. In his 1909 paper, Lawrence somewhat rashly claimed *`we have before us the weights themselves'*. His inability, by his own admission, to draw any useful conclusions was mainly due to the inaccuracy of the claim at that time. Now, nearly a century later, we really do have the weights before us.

The items on the next page are listed in date order. The author will be delighted to learn of any items which have been overlooked, but please note that articles which are entirely concerned with coin-scales, rather than coin-weights, are omitted on purpose.

Historical Bibliography on British Coin-Weights

L.A. Lawrence: Coin Weights, British Numismatic Journal 6 (1909) 287-303. See also the report of the meeting on pages 381-383 and 394.

H Read: A Box of Coin-Weights in the British Museum, *Proceedings of the Society of Antiquaries,* (second series) 29, (1916-17) 17-24.

M S Dudley Westropp: Notes on Irish Money Weights and Foreign Coin Current in Ireland, *Proceedings of the Royal Irish Academy,* Section C, 33 (1916) 43-72.

T Sheppard: Money-Scales and Weights, *Transactions of the Yorkshire Numismatic Society,* 2, (1918), appendix.

T Sheppard & J F Musham: *Money Scales and Weights,* Spink, London 1923, reprinted 1975. Based on articles originally published in the *Numismatic Circular*, 1920-23.

A Dieudonné: *Manuel des Poids Monétaires,* Paris 1925.

V B Crowther-Beynon: Notes on a collection of money-scales and other coin-weighing appliances, *British Numismatic Journal,* (1925-6) 183-192.

V B Crowther-Beynon: Notes on some unusual money weights, *British Numismatic Journal,* 21 (1931-33) 93-102. See also report of meeting, pages 227-228.

F Mateu y Llopis: *Catalogo de los Ponderales Monetarios del Museo Arqelogico Nacional,*, Madrid, 1934.

R Turner: Weighing Money in the Olden Days, *Eagle*, 1936.

D F Allen: A fourteenth-century coin-weight, *British Numismatic Journal,* (1934-37) 189-190. [The object described is not confirmed to be a British coin-weight.]

G P Dyer: The Office of Stamper of Money Weights 1774-1870, *Libra,* vol. 5 20-21, 29-30, and vol. 6, 6-7, 12-13, 24-25.

R Stocks: Guinea weights, *Libra,* vol.7; reprinted, with photographic illustrations by M A Crawforth in *Equilibrium,* (1982) 459-467 and 495-503.

R Stocks: Nineteenth-century sovereign weights, *Libra,* vol.9, (1970-71) 32-35, 50-53, 65-68, 86-87, 102-106.

F G Lavagne: Catalogue des dénéraux -- Grande-Bretagne, *Archeonumis,* 17 (1976) 42-44 and 20 (1976) 45-52.

A G Mallis: Notes on English Coin Weights, *The Numismatist,* 89 (1976) 1685-1709.

A G Mallis: Coin Weights for Foreign Coins that were Current in Ireland, *The Numismatist,* 91 (1978) 7-16.

A G Mallis: English Coin Weights for Portuguese Coins Current in England, *The Numismatist,* 91 (1978) 1797-1819.

G M Houben: *European Coin-Weights for English Coins*, Roermond 1978.

M A Crawforth: Simple weights for coins, *Equilibrium,* (1979) 166-167.

G M Houben: *The Weighing of Money,* Roermond 1982.

N L Biggs: English coin-weights, *Equilibrium,* (1986-88) 879-884, 913-919, 951-954, 984-988, 1010-1016, 1040-1046, 1060-1066, 1079-1086, 1125-1132.

N L Biggs: Coin-weights in England -- up to 1588, *British Numismatic Journal,* 60 (1990) 65-79.

P and B Withers: Hallmarks on base metal, *Equilibrium,* (1991) 1471-1478.

G M Houben: The earliest English coin-weights, *Equilibrium.* (1992) 1561-1562.

N & Q 126 — reply from Joel Malter

I have an early Mediaeval set of nesting weights of the type discussed on EQM page 1751-1752. My set was weighed on an electronic scale which is not 100% precise, but these are the results that I got: Total weight is 102.05 grams. Master cup is 46.46 grams.
Total 4 inside cups weigh 53.63 grams, Round filler weight is 1.69 grams.
The set is made of bronze. The master cup is 5 cm at its widest, and 3.5 cm. at its narrowest. It is 13 mm. in thickness. The largest cup is 3 cm diameter, and 12 mm high. It weighs 28.37 grams.
The next is 2.5 cm diameter and 9 mm high. It weighs 14.32 grams.
The next is 2 cm diameter and 6 mm high. It weighs 7.02 grams.
The next is 1.5 cm diameter and 4 mm high. It weighs 3.3 grams.
The dot design on the master cup forms a cross. The mouth of the top is partly broken.
The set was found in Lincolnshire, England.

Fig.1. Master cup showing birds' eye punched decoration.

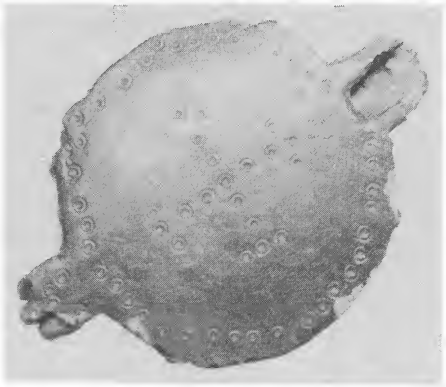
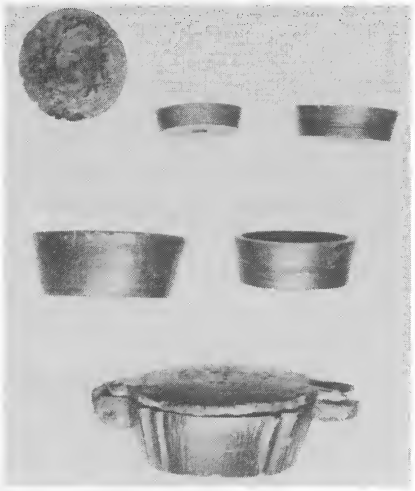


Fig. 2. Side view showing buttresses.



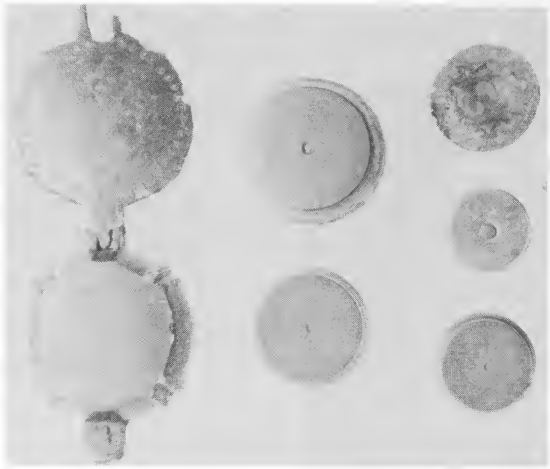


Fig. 3. View of bases. Note the smooth finish.

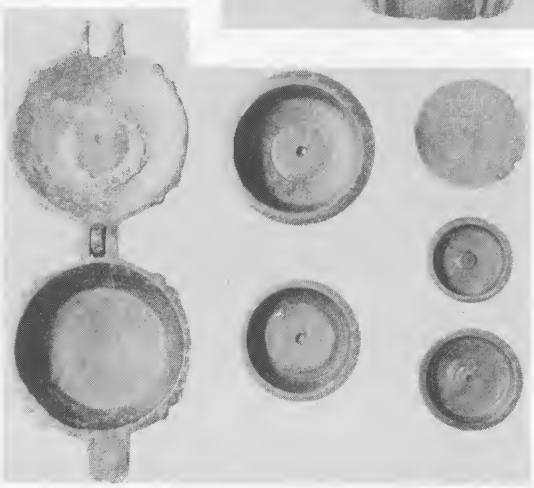


Fig. 4. View of interiors, showing corrections inside.

N & Q 126 reply from Ritzo Holtman

On receiving details of Joel Malter's weights, I made some calculations, and found that the cups deviated from the correct units. Omitting the "house" and the central piece, the three bigger cups are quite accurate. The smallest cup deviates a lot. The cups fit loosely, and I assume that they were fitted into the earlier "house" during the 16th century. On examining the photographs, it is clear that the central piece was soldered to the lid of the "house," but is now separate. The "house" is unusual because the double buttresses are rare on the continent. This is an interesting example of extending the working life of a useful weight.

N & Q 126 reply from Norman Biggs

Because the housing cup is damaged, it is impossible to state categorically which weight system it was made for, but the inner cups seem at first glance, to be for the smaller Avoirdupois ounces. However, the cups may be worn down Troy ounce weights. The Paris Troy oz weighed 30.5 g, and the English Troy oz. weighed 31.1 g.

N & Q 126 reply from D Hitchins

The buttresses echo the design on the outside of English mortars made of bronze in the 15th and 16th century, for the use of apothecaries and cooks who needed to grind up their ingredients. By about 1600, buttresses were replaced by a thick collar round the rim of the mortar.

Irish Makers/ Retailers, Pt 2 by D Crawforth-Hitchins

Samuel Gatchell & Sons working 1835–1888

1835–1845	87, Pill Lane, Dublin
1845–1850	61, Pill Lane, Dublin (87, renumbered.)
1848–1888	9, Mountrath Street, Dublin
1856	6, 7, 8 & 9 Mountrath Street, Dublin
1859	55, Henry Street, Dublin
1862	7, Dawson Street, Dublin

Fig. 21. The altered trade card. The mahogany box is a classic Irish curved box, which was made after 1848. This lobed style lasted well over a hundred years. Withers' photo.

Samuel Gatchell & Sons made a set of Standard Volume measures of brass, marked "Samuel Gatchell & Sons, Dublin," and on the rim, "1835."– This gave the first evidence of Samuel's sons being in the business. The measures went from half a gill up to one gallon capacity. See Mollan.

Samuel Gatchell & Sons continued to use the trade card of Samuel Gatchell, by having the name re-engraved, and the address re-engraved to read *"_, Pill Lane & 9, Mountrath Street, Dublin."* See Fig. 21. They were first recorded in Mountrath Street in 1848. The trade card was used in a mahogany coin scale box of the characteristic curved Irish design, long after the English had debased their boxes to plain made-up boxes, in the vast majority of cases.

Guinea weights and sovereign weights were made with a crown in the centre, encircled by *"S Gatchell & Sons, Dublin."* On the reverse *"One Guinea, 5 PWT * 8 GRS."* It is interesting to note that guinea weights were still in demand so long after they had disappeared from England. (They disappeared from England by about 1835.)

Fig. 22. Sovereign weight. Withers photo.

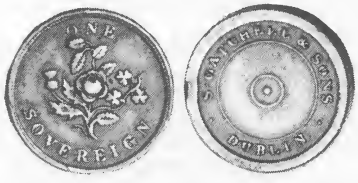


Fig. 23. The later design, probably made by Avery's for S Gatchell & Sons.

W & T Avery made a pretty sovereign weight of very distinctive design, with a rose, thistle and shamrock intertwined, (the symbolic flowers of England, Scotland and Ireland, respectively,) echoing the second design of half-sovereign (which had to be re-designed

because people were gilding sixpences and passing them off as half-sovereigns, the designs being very similar,), the new design being first minted in 1823. Avery's made a special order with *'S Gatchell & Sons, Dublin'* on them, for Gatchells to sell in Ireland.


NEW STANDARD

Avoirdupois Apothecaries' Weights.

1850.

2 DRACHMS	109, 36	grains.
1 DRACHM	54, 68	,,
½ DRACHM	27, 34	,,
2 SCRUPLES	36, 11	,,
1 SCRUPLE	18, 22	,,
½ SCRUPLE	9, 11	,,

SAMUEL GATCHELL & SONS,

MOUNTRATH STREET, DUBLIN.

Fig. 24. This label referred to the "New Standard", a regulation that I cannot trace, as Troy weight was used for Apothecaries' medicines until the end of the century. This chart defined Avoir-dupois drachms in Troy grains. It was wrong by 100%. 1 drachm Avoir weighed 27.34 grains Troy. The Avoir system never included scruples of any weight!

Samuel Gatchell & Sons were making scales for exclusively apothecary's use, having a special label printed in 1850, after they had left the Pill Lane premises. See Fig. 24.

An iron trade beam of traditional, good quality design has survived. See the cover picture and Fig. 25. It was 33 inches long (850 cm) and could well be mistaken for an English beam, except for the central bearing, which had a protruding collar, to protect the full length of the knife edge.

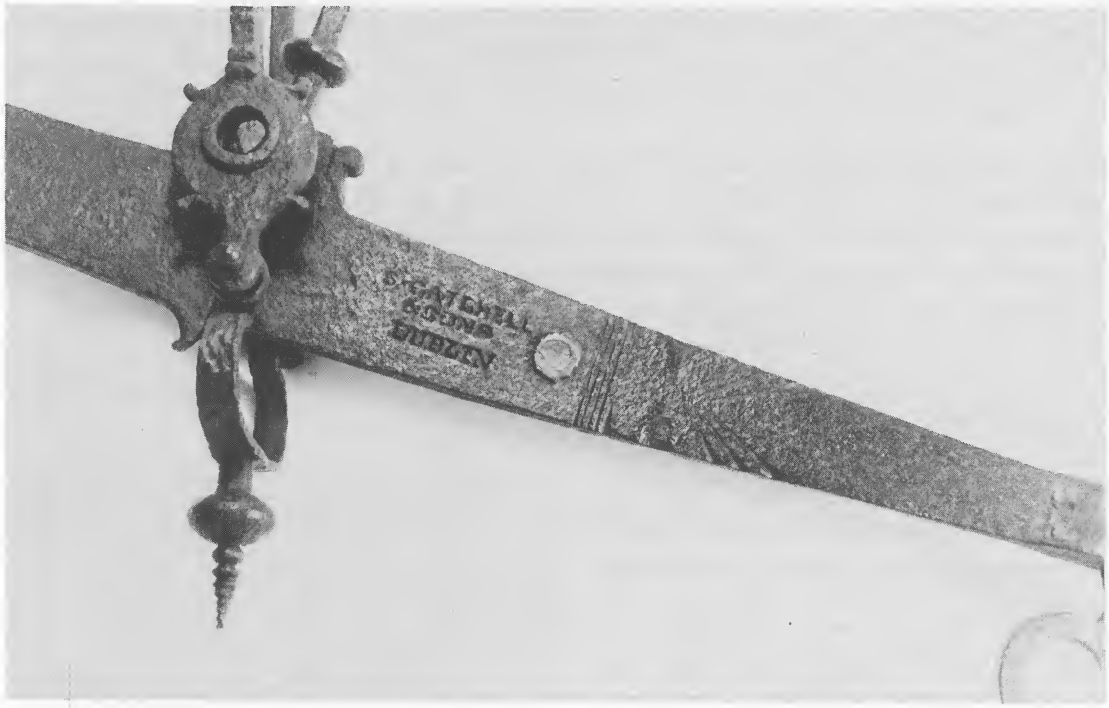


Fig. 25. Note the lead plugs, which were last stamped in the late Victorian period, circa 1895. The collar protrudes to protect the central knife-edge. Corrosion has pitted the pendant.

The cheeks covering the end bearings were much thinner than normal, but seem adequate for the job. The extensions to the cheeks, which attach the box–ends to the beam, were slightly less well–finished than normal, so that the method of manufacture was more apparent than normal. The paint has been removed, so no clues are left as to the original colour scheme, but the removal has inadvertently revealed the method of fixing the cheeks to the box end bearings. A shiny line of brass shows over the top curve of the box, where the brazing was done.

Another trade beam survives by "Gatchell & Sons Dublin," made either by Samuel Gatchell & Sons, or by Robert Gatchell & Sons. The beam was 48 inches (1190 mm) long, with shackles and double hooks. (See Mollan.)

As Samuel Gatchell must have been born in about 1770, presumably he died long before the company changed its name in 1890.

Gatchells added 6 & 7 Mountrath Street to 8 & 9 Mountrath Street in 1856, when they were ironmongers, house furnishers, and beam and scalemakers. In 1859 they moved to 55 Henry Street, and, in 1762, to 7 Dawson Street, where Robert G. Gatchell and Sons continued the business, but with a greater emphasis on plumbing work and gas–fitting .

Thomas Grubb working 1839 – 1879

1839 – 1854 1, Upper Charlemont Street, Dublin
1855 – 1858 14, Leinster Terrace, Rathmines, Dublin
1859 – 1863 15, Leinster Terrace, Rathmines, Dublin
1864 – 1878 141, Leinster Road, Rathmines, Dublin

Thomas Grubb was not a manufacturer of scales, but a scientist and a Fellow of the Royal Society. He did, however, make a chemical balance in a glazed mahogany case, with a heavy brass lattice beam, supported by steel knife–edges on an agate plane. The pans rest on brass discs lined with green velvet when at rest, and the pointers at the ends of the beam read two curved ivory graduated scales, marked 30 –0 –30.

It was exhibited at the Royal Dublin Society Bi–centenary Exhibition in 1931, where it was described as being made about 1835 by Thomas Grubb for use in the construction of instruments for Dr. Humphrey Lloyd for the new Magnetic Observatory in Trinity College. It was specially designed for the weighing of heavy objects to a high degree of accuracy, and was awarded a silver medal by the Royal Dublin Society in 1844.

GH working early 19th century

early 1800s Dublin?

A set of nesting weights stamped on every cup PICKERING and PILL LANE, also stamped GH and IT. These makers/inspectors have not been identified.

TH working 1679??

possibly Cork?

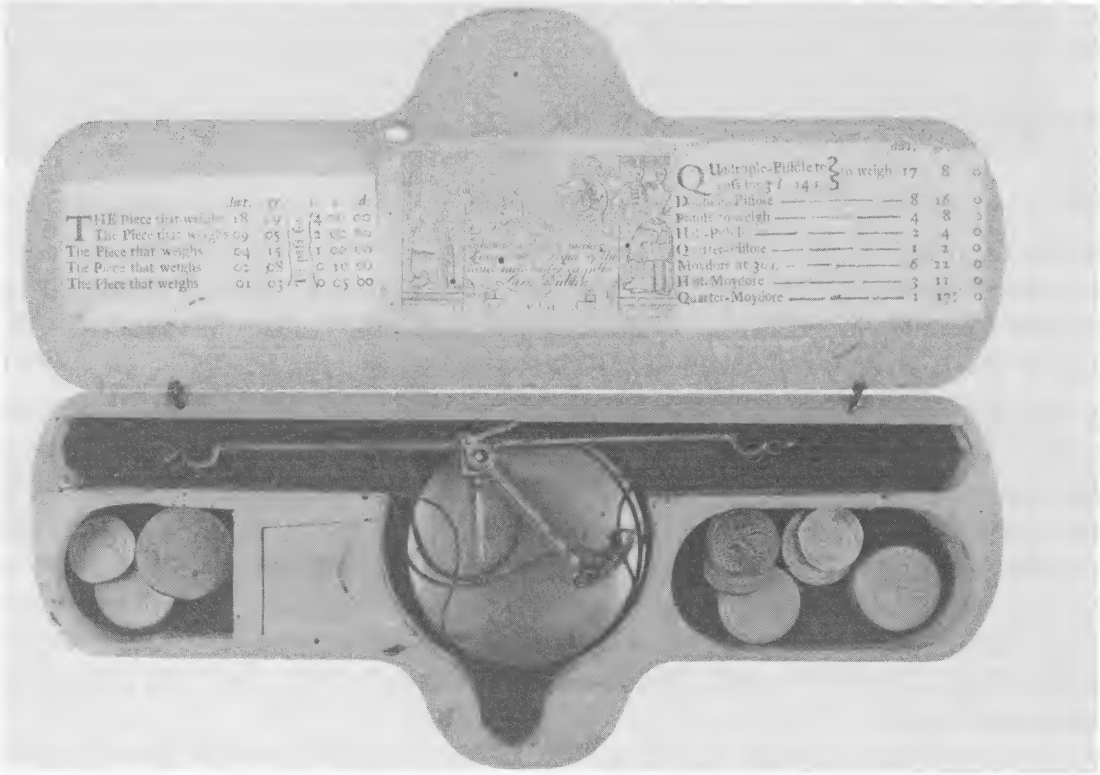
The die of a 2 reale weight made by Richard Smart of Cork was altered crudely, by the addition of **TH 1679**. See Withers no. 2557a.

Ephraim Hand working about 1725?

c. 1725? at the Hand & Scales, Pill Lane, Dublin

A coin scale (Fig. 26,) in the Ulster Museum has a superb trade label, strongly reminiscent of the trade label used in London by Samuel Neale, (working 1644 to 1690,) Henry Neale, (working pre 1692 to 1705,) and Western Gowers, (working 1690 to 1707.) It would be easy to suppose that Ephraim Hand was a contemporary of these London makers.The beech (?) wood box was

Fig. 26.



exceptionally long, being 13 inches, (32.5 mm,) extreme even by Irish standards. It had the curved front so familiar on later boxes, and was lined with green baize. One cannot say, when talking about Irish scale boxes, that baize indicates a box made after about 1720, as one could say of English boxes, but it might be an indicator that it was not made much earlier. The hinges were wire loops, not the more expensive brass plate hinges. The beam is not original, as its small size indicates. The lid was the same size as the base, but the lid was not filed to allow in a thumb-nail, as with other Irish boxes.

Fig. 27. London label of Henry Neale

The label for the coins current from 1725/6 was applied to the lid, possibly after the box had been in use for some time, as the original trade label had been rubbed by the central knife-edge. The list was only useful until 1737, as "new gold" coins became current

from 1737 onwards, so we can presume that the list was stuck in before 1737. This leads us to the conclusion that Ephraim Hand had to be working before 1737, as his label was underneath.

Hanson, working c. 1960
Eire

The author has a set of bathroom scales, platform with compound lever system, with *'Hanson, Eire'* on the dial. It has a spring resistant, and lens to enlarge the dial indicator, with a very flat case painted white.

Charles Harrison working 1766 – 1810

1769 Main Street, English Town, Limerick
1788 opposite St. Mary's Church, Limerick

Charles Harrison was first recorded working in 1766. By 1769 he was recorded as a watch and bit–maker, book–seller and stationer in Main Street, Limerick. He had an advertisement in the Limerick Chronicle on 13th July 1786, stating that he was a maker of watches, gold scales and weights. By 1788 he was a watch and clock–maker opposite St Mary's Church, Limerick.

No advertisement is recorded that mentioned that he made compass dials, five of which have survived. [Compass dials were a very necessary adjunct to a watch or clock in country areas, before the days of the radio, enabling the owner of the watch to adjust it correctly by reference to "sun–time" as shown on the sundial, or by the portable dial in a case.] The pedestal dials were made for gardens in the Limerick area, ranging from latitude 52°16' to 52°30'. His portable dials were kept clean and safe in a brass case. The one in the Museum of the History of Science in Oxford is inscribed *"Made by C Harrison in his 85th Year, his gift of love to his Grand Daughter, Rosetta Hughes, 1810."* So Charles Harrison was born in 1725 and was presumably working well before 1766.

Weights have survived. An Irish light guinea, with *"Cha^{S} Harrison, Limerick"* in a curve is recorded by Sheppard and Musham. What a pity that none of his coin scales have survived.

HJ working after 1817

after 1817 possibly Dublin ?

Nicely made guinea, sovereign and half–sovereign weights in the Dublin style, recorded by Withers, no. 2780, 2782 and 2783. The reverse had plain, polished surfaces with a raised edge, and bold initials **H*J** in the middle, the same style as Daniel Crosby, David Pickering and James Pickering used on their weights. Because the sovereign was not minted until 1817, this maker had to be working after that date.

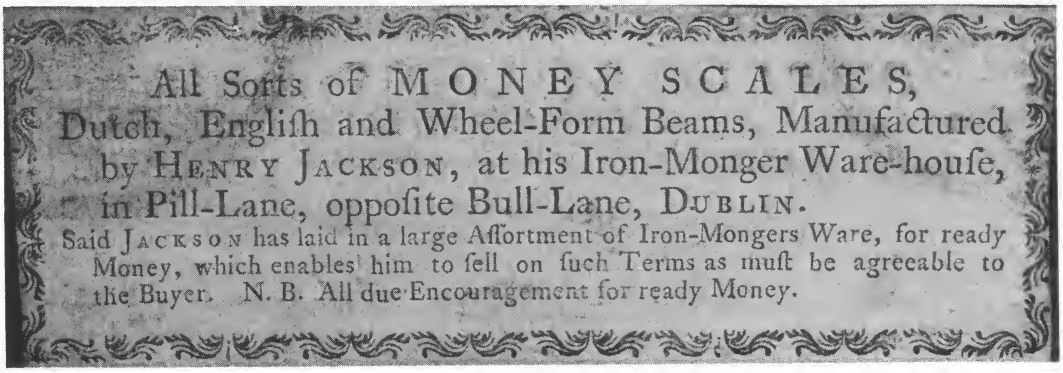
Fig. 28. Sovereign weight by H * J. Withers' photo.

Henry Jackson working 1769 – 1794

? at his Iron–Monger Ware–House, in Pill Lane, opposite Bull–Lane, Dublin
? 87, Pill Lane, Dublin

Henry Jackson was working in Pill Lane from 1769 until 1794 as an ironmonger. "Ironmonger" meant only a dealer in iron objects, not a manufacturer of iron objects. However the trade–card in his coin scales stated *"All sorts of MONEY SCALES, Dutch, English and Wheel–Form Beams,*

Fig. 29. An unusually simple trade card by Henry Jackson. Withers' photograph.



Manufactured by Henry Jackson". See Fig 25. If only we knew what Jackson meant by Dutch and Wheel–Form beams. [Jackson was living many years before the Dampier type circular pendulum scales were devised, and a century before the circular equal–arm beams were put onto precision balances, so we must await the discovery of a Wheel–Form beam to find out what Jackson meant.]

Jackson emphasised the need for ready money, *"N.B. All due Encouragement for Ready Money."* Ireland was chronically short of money, because there was a shocking shortage in the whole of the British Isles, and particularly in Ireland. The English imposed taxes on Irish goods imported into England, and raised other barriers to trade, so that the Irish had great problems earning money abroad. The English never adequately acknowledged the Irish need for ready money.

The Irish used foreign **gold** coins when they could, but, for silver and copper coinage used for ordinary shopping, they were more or less dependent on what they could obtain from England, and on old tokens. They resorted to bank notes many times during the 18th century, but the banks failed to honour the notes frequently enough for the Irish to become suspicious and cynical about banks and bank notes, so that they struggled to cope without much ready money. They also used tokens and promissory notes which were not always honoured. It is easy to see why Jackson emphasised his desire to trade for ready money.

Henry Jackson's coin scales were extremely finely made, almost in the London style, but shaped in an exaggeratedly elegant way, with a very thin beam with the narrowest of "wrists." The pointer was almost as long as half the beam, in the characteristically Irish way, (in the proportions used by English coin scalemakers in the 17th century.) The collars each had a fine band each side of the bulge. The brass pans were stamped **H:J** in a denticulate rectangle, the stamping of initials in the pans being characteristically Irish. See Fig. 31.

The cords were tied differently from London scales; – all three cords were the same length, came up through the ball, round the 8 ring, down through the ball again and were knotted below the ball. The ball was a wooden bead, covered with green silk thread, blanket stitched over the wood. [English makers would have worked the tassel over a ball of lambs' wool or green threads.] The tassel was cream silk.

The weights were slightly curved–sided rectangles of thick brass, filed by hand to a curved profile. The number of pennyweights were indicated by five–petalled roses stamped on the required number of times – six roses for 6 pwt. etc. The inspector's mark was a lion passant facing to the left, like the assay mark of Goldsmith's Company in London.

Fig. 30. Henry Jackson conformed to the Irish conventions in every respect. The beam is 4¾ inches (120 mm) long, with a very raised cupid's bow under the central bearing. The shears' head has proportionately, the largest holes I have seen. Every line is filed deeply and confidently to enhance the shapes. The lines on the pans are deeply incised, and the stamps were thumped solidly, to leave a crisp indentation. Because the lining in the box is loose, it is possible to examine the wood under the weight pan recess. It has been chiselled out, not reamed out. Every chisel mark is broad and rhythmical, denoting a very sharp chisel used expertly.

The box was a straight-sided, cut-from-solid, mahogany box with rounded ends, (as were many London-made boxes,) but the corners were polished off, and the front edge of the box was filed off, to allow access of a thumb nail easily, to open the box neatly, yet another Irish characteristic. It was not particularly Irish-looking on the outside, but it was when the box was opened. The large oval holes for the weights were very like the holes shaped by Daniel Crosby, being bold, nicely shaped and big enough to allow easy access to the weights for even the largest fingers. The original small brass screws holding in the hinges, have been replaced by huge steel screws that have damaged the hinges. Only one hook was used, to the left of centre, when an English maker would have used two hooks.

There was a Henry Jackson, sword-cutler and toy-man in Christ-Church Yard, Dublin in Wilson's Trade Directory of 1761. Did he train his son to make fine scales?

Fig. 31. Mark in the pans.

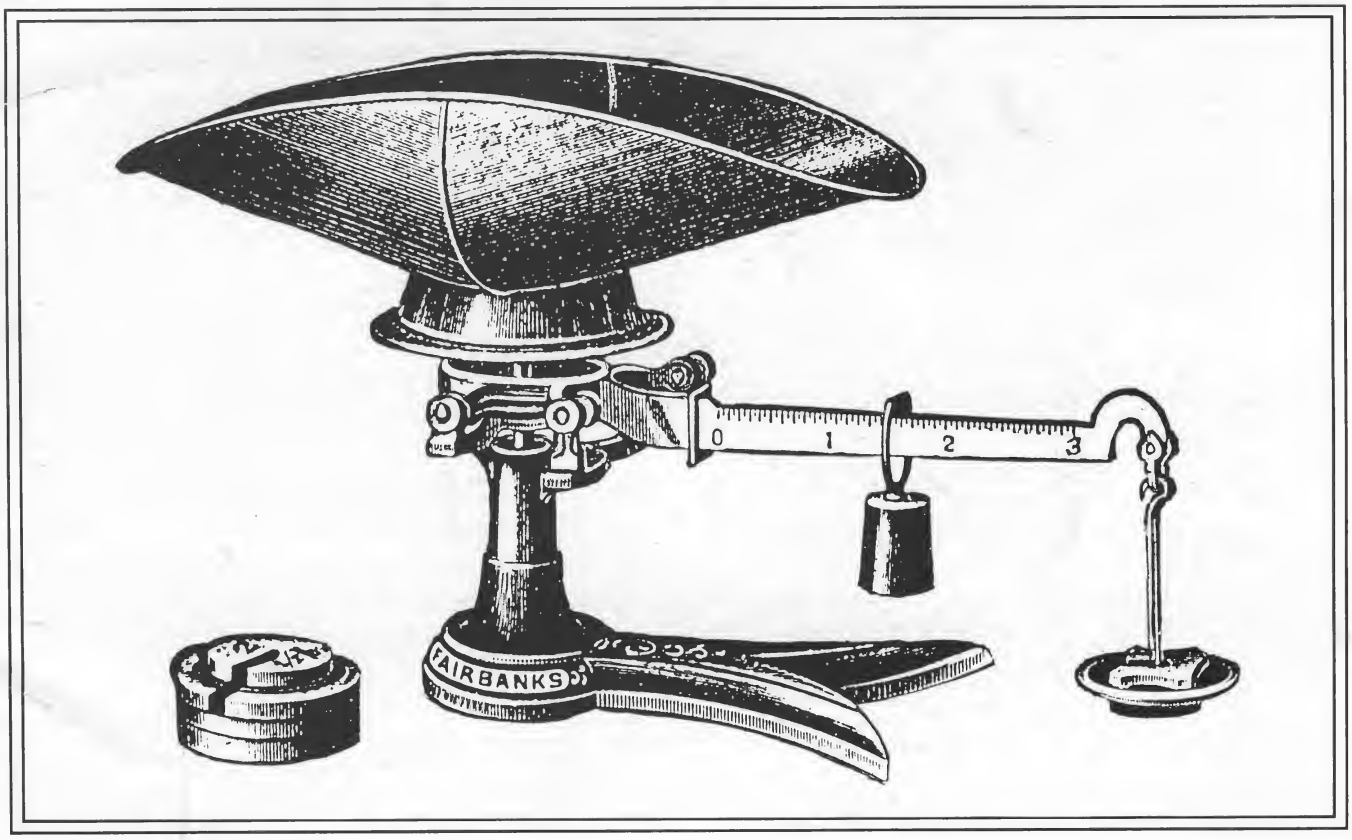
Part 3 in the next EQM.

ISASC

EQUILIBRIUM®

QUARTERLY MAGAZINE OF THE INTERNATIONAL SOCIETY OF ANTIQUE SCALE COLLECTORS

1994—ISSUE NO. 3 PAGES 1805-1832



Cover Picture

Sent in by T STEIN

Fairbanks' Spice Scale, shown in the catalogue of Norvell–Shapleigh Hardware Co. of St. Louis in 1903. Capacity ½ oz. to 35 lbs. Average weight 35 lbs. (The catalogue gave the weight of every object, so that packing and postage costs could be worked out by the purchaser.)

No. 570 Single beam, with tin scoop..... $10.00
No. 572 Single beam, with brass scoop..... $11.00
No. 574 Double beam, with tin scoop..... $11.00
No. 576 Double beam, with brass scoop..... $12.00

The half–roberval linkage prevented the plate from tipping. The linkage was composed of the rear part of the steelyard, a vertical rod within the pillar and a horizontal leg or stay, attached to the rod and, at its other end, to the inside of the 'claw' of the iron stand.

The steelyard was graduated 0–3 lbs., with a hanger on the 'goose–neck' to take the tare poise, as shown in the picture. The slotted poises were added as needed. The ½ lb. poise shows clearly. It would balance 2 lbs of spice. The larger poises may have been 1½ lbs (=5 lbs) 2½ lbs (=10 lbs) and 5 lbs (=20 lbs.) The thought of any customer's wanting 35 lbs of one spice is surprising, when spices must be used quickly, to avoid loss of aroma and flavour.

On studying the Fairbanks' catalogue of 1906, it was obvious that Norvell–Shapleigh was not offering the full range of Fairbanks' Spice Scales, as the following versions were also for sale. Norvell–Shapleigh's prices were the same as Fairbanks for the same articles, so presumably Norvell–Shapleigh bought from Fairbanks at a considerable discount, in order to make a profit. In England at that time, a discount of 33% for bulk purchase was quite normal.

No. 571 Single beam, with tin scoop, marble plate..... $12.00
No. 575 Double beam, with tin scoop, marble plate..... $13.00
No. 577 Single beam, Russian Iron Scoop..... $13.00
No. 579 Double beam, Russian Iron Scoop..... $14.00

EQUILIBRIUM is published quarterly in January, April, July and October.

Editor—Diana Crawforth-Hitchins 15 Hawthorn Ave, Headington Oxford OX3 9JQ, England

ISSN-0893-2883

Fairbanks' Union Scale

From T STEIN

comments by D Crawforth-Hitchins.

In 1859 Fairbanks offered a "Union or Family Scale" with one steelyard attached to a scoop above and a platform below, capacity ½ oz. to 240 lb. Price with tin scoop $10, with brass scoop $10.50, (Fig. 1.) It was easy to pass this illustration many times without realising how peculiar the scale was, as compared with normal top-pan steelyards so widely used in America, (Fig. 2.)

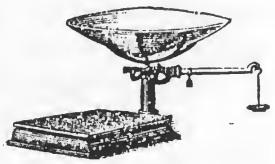


Fig. 1. Fairbanks 1859.

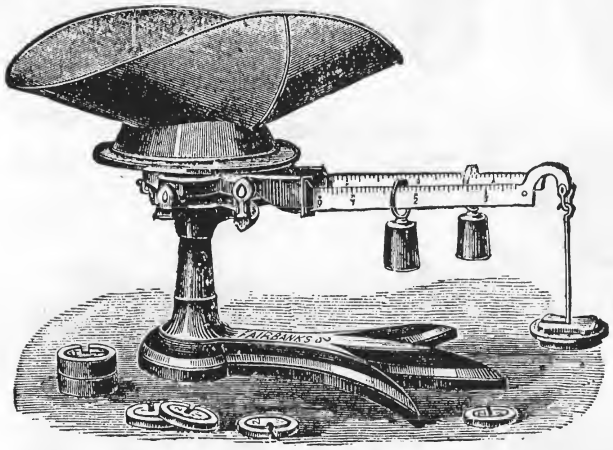


Fig. 2. Fairbanks, 1903. Shown in Norvell-Shapleigh's Hardware Co. catalogue. For grocers. Capacity ½ oz. to 63 lbs. Average weight (for postage,) 55 lbs. Price $12 to $14.50, with single or double beam and tin or brass scoop. Half-roberval and steelyard.

Ted Stein has lent ISASC a wonderful catalogue of 1903 from Norvell-Shapleigh Hardware Co, that showed this Fairbanks Union Counter Scale clearly (Fig. 3.) What was this abnormal scale? The catalogue gave no explanations or instructions for use.

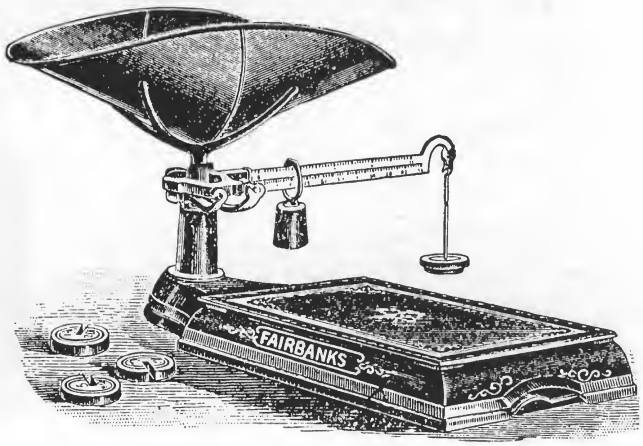


Fig. 3. Fairbanks' Union Counter Scale, 1903. Shown in Norvell-Shapleigh's catalogue. Half-roberval and steelyard, with the bottom linkage of the roberval being formed by the Y frame of the compound lever of the platform scale.
Platform 10½ x 13½ inches, with fork scoop holder. Capacity ½ oz. to 240 lbs.

	Each
Single beam with tin scoop	$14.00
Single beam with brass scoop	15.00
With two platforms instead of fork scoop holder:	
Single beam with tin scoop	$14.50
Single beam with brass scoop	15.50

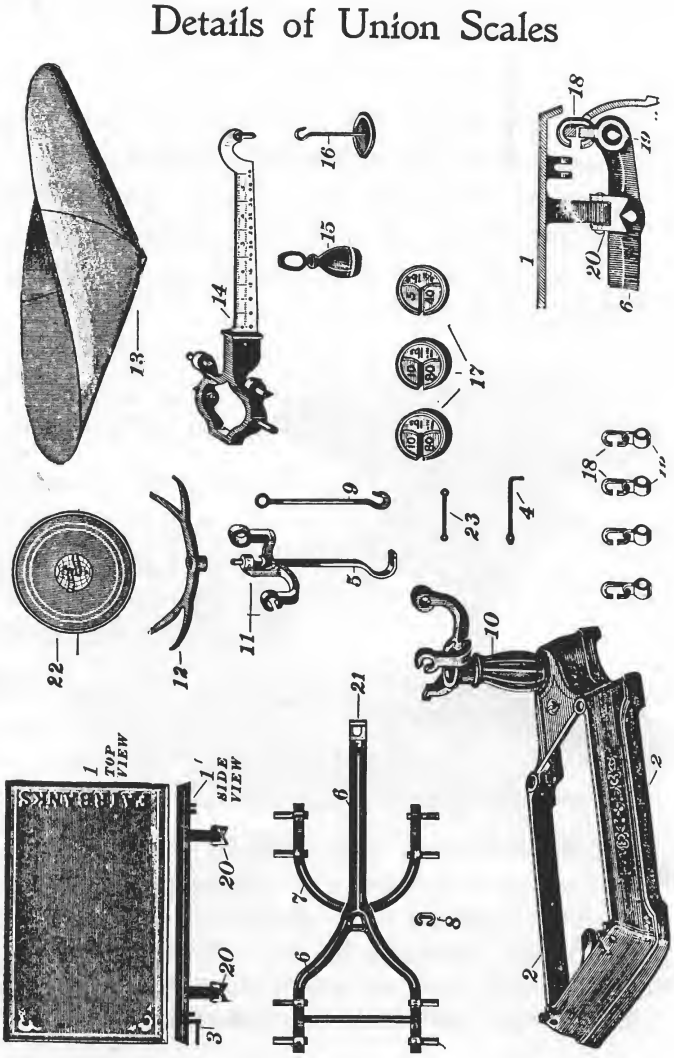
In the Fairbanks catalogue of 1906, on page 414 (Fig. 4,) Fairbanks made it clear that Union meant "United," in that there were two weighing positions combined, with two sets of graduations along the same steelyard beam. If there were two sets, reading up to 5 lb. and up to 40 lb., there ought to be four pivot points, one working as the fulcrum on which the steelyard tipped, one pivot point on which the platform linkage pulled, one pivot point on which the scoop pushed and one for the hanger on which the slotted poises were hung.

The so-called Union Scale derives its name from its form of construction, whereby coarser weighings are obtained by placing loads upon the large platform, and finer ones with the load in the scoop.

Fig. 4.

On examining the exploded drawing in the Fairbanks' catalogue of 1906, (Fig. 5,) it was obvious that there **were** four pivot points, but

Fig. 5. Exploded drawing of parts.



not in the normal line, that would be found on a turn-over steelyard, (Fig. 6.) [There were **pairs** of pivot points on the Union Scales because the steelyard was bifurcated on the scoop end, into a ring shape, (Fig. 7,) but think of each pair as one pivot point.]

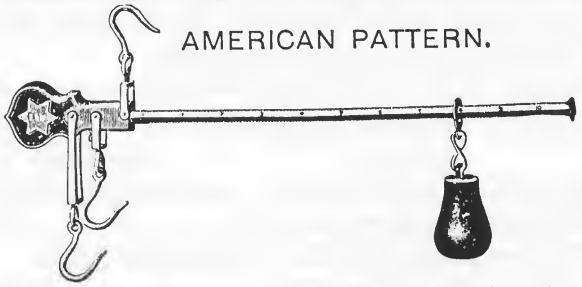


Fig. 6. Peck, Stowe and Wilcox Co, (P S & W,) 1903. Shown in Norvell-Shapleigh catalogue.

There were three in line with the steelyard, one under the scoop, on which the scoop pushed down, one under the steelyard, acting as a fulcrum on which the steelyard rocked and one pivot on which the hanger was suspended. The fourth pivot point was hidden between the pair of pivot points on

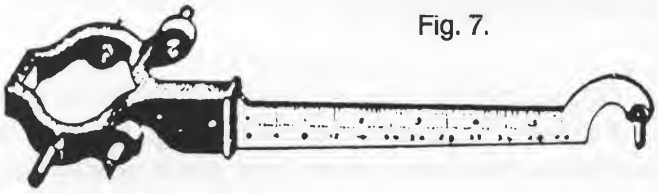


Fig. 7.

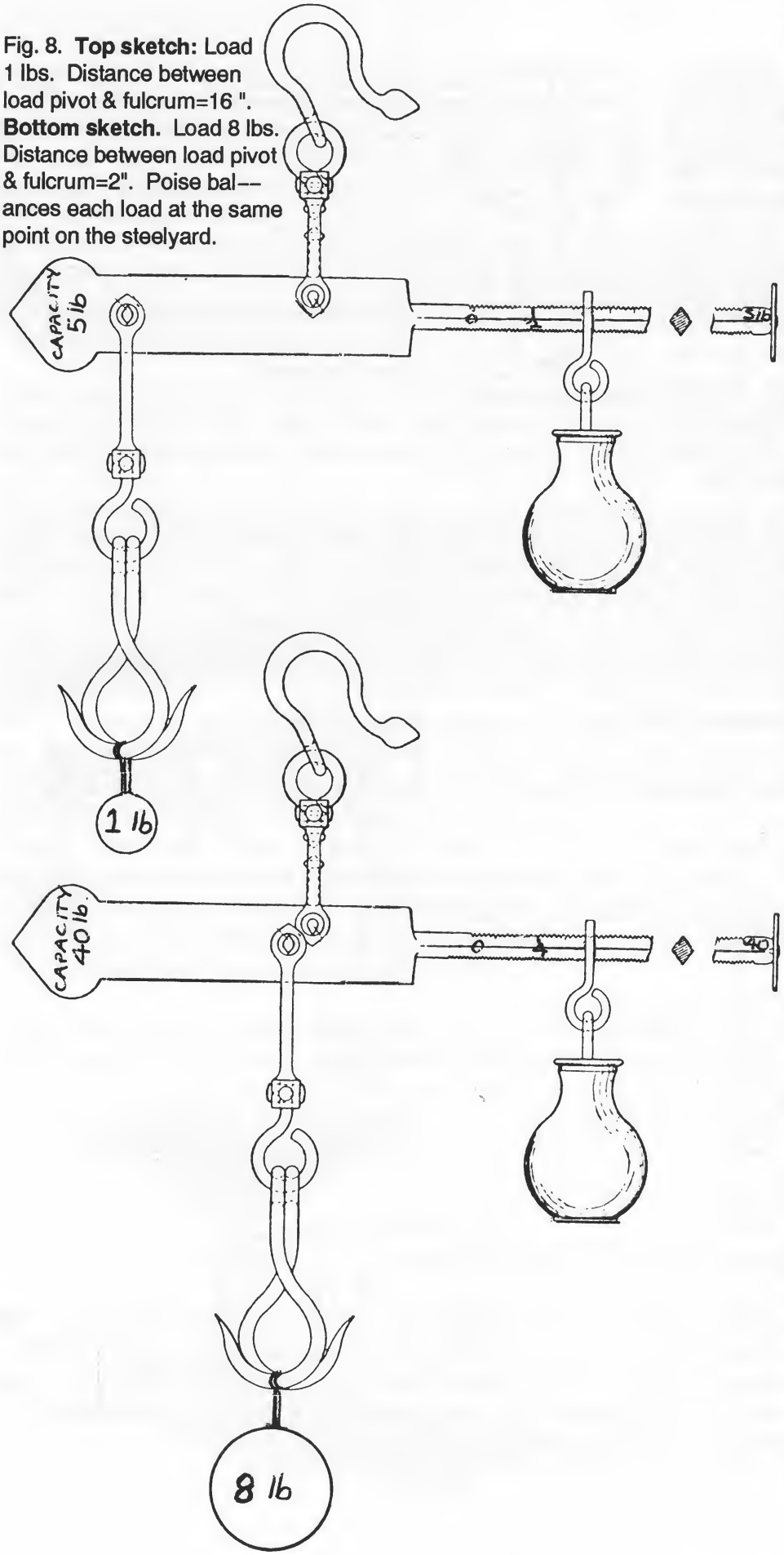


Fig. 8. **Top sketch:** Load 1 lbs. Distance between load pivot & fulcrum=16 ". **Bottom sketch.** Load 8 lbs. Distance between load pivot & fulcrum=2". Poise bal-- ances each load at the same point on the steelyard.

which the scoop pressed, and att-ached to the rigid rod, called the cross head post. The load put on the platform pulled down the cross head post, which in turn, pulled down the steelyard in the same plane, hori-zontally, as the scoop pushed down the steelyard. (See the sketch in Fig 9.)

So we now understand how two load positions were both attached to one steelyard, but the next question is "Why were there two different sets of graduations, if both loads bore on the steelyard at the same place?" The rule with steelyards is that the ratio of the graduations, when using one poise, varies as the distance between the pivot point and the fulcrum. Or, as G A Owen put it, *when equilibrium is est-ablished, the forces acting at either arm are inversely proportional to their distance from the fulcrum.* So, a poise balances one pound when the distance between the pivot

point and the fulcrum is (say) 16 inches; the same poise will balance 8 pounds at the same point on the steelyard if the distance between the pivot point and the fulcrum is 16 8= 2 inches. (See the sketch in Fig 8.) So was there another knife edge, which was eight times nearer to the fulcrum for the load on the platform, (as the graduations were eight times closer together on the lower graduations?) There was not.

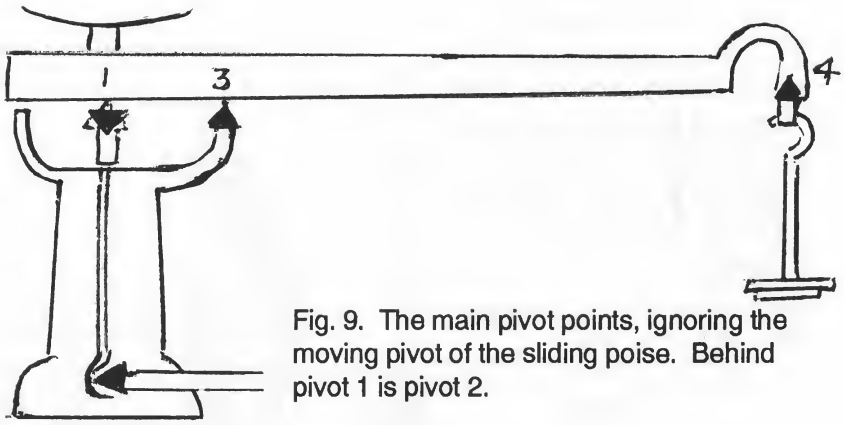
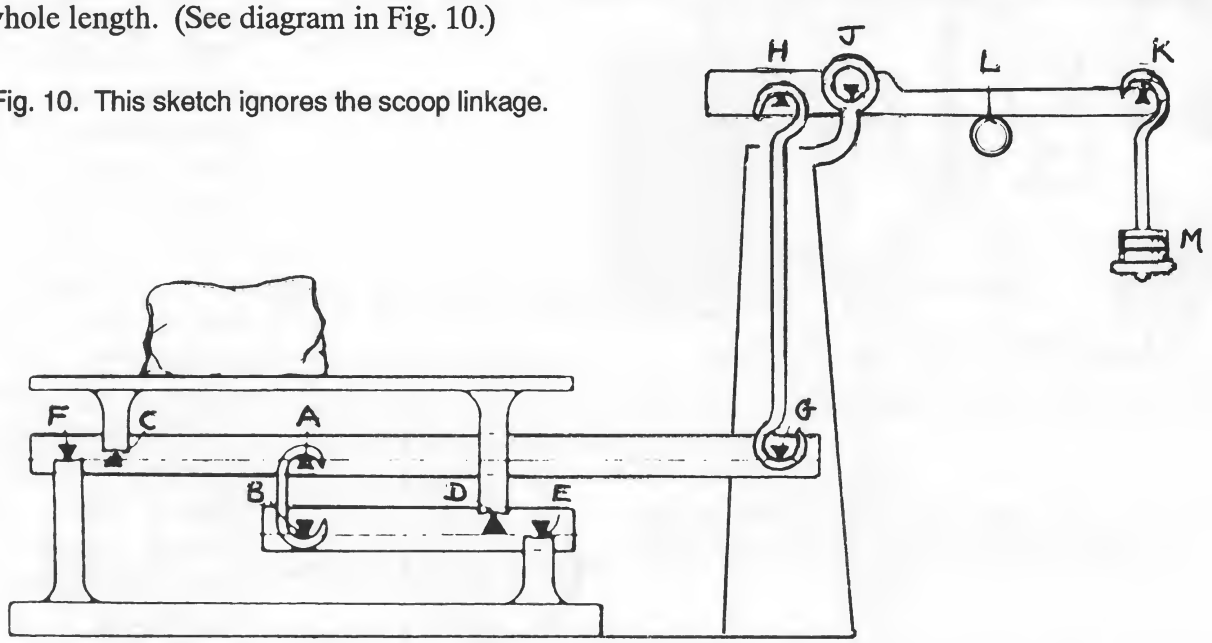


Fig. 9. The main pivot points, ignoring the moving pivot of the sliding poise. Behind pivot 1 is pivot 2.

The Y frame under the platform gave the clue to the eight–times–heavier graduations. The Y frame and its linked U frame were called compound levers. They interacted, and together produced that crucial ratio of 8:1 that was showing on the blade of the steelyard. The two frames acted as three little levers. The U frame was one complete lever, the same length as the V part of the Y frame, which was, in effect, a second lever. They met in the middle, under the platform and together pulled down on the whole Y frame, which was a third compound lever along its whole length. (See diagram in Fig. 10.)

Fig. 10. This sketch ignores the scoop linkage.



The mathematics of the compound lever worked like this:–

If length FA is 2 times FC, and EB is 2 times ED (both FA and EB being the same length) then the weight of the load has to be divided by 2, and that is the downward force at point A (and B, because A and B are linked together.) That is, half of the force of the load is taken by the fixed pivots F and E, and half is bearing down on the pivots at C and D. So, if the load weighed 16 lbs., then the downward force at point A is 8 lbs.

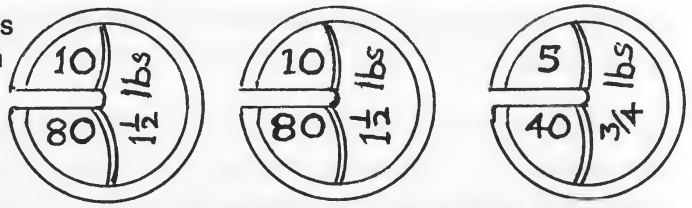


Fig. 11. Sketch of the slotted poises. The figures on the right of each show the real weight of each poise. Figures at the top indicate the weight of the load in the scoop that each will balance, and figures at the bottom indicate the weight of the load on the platform that each will balance.

If length FG is 4 times longer than length FA, then the downward force at point G is one fourth of the force at point A. So, if the downward force at point A is 8 lbs, it will be 2 lbs at point G. Or, to put it another way, the downward force at point G= weight of the load divided by 2, then divided by 4.

If the downward pull at the bottom of the cross head post (G) is 2 lbs, the pull on the steelyard arm (H) is also 2 lbs. But, if the user moves the poise (L) along the blade until it is in equilibrium, and reads the bottom line of graduations, he will **read** that the load weighs 16 lbs.

The user could put a load of up to 40 lbs. on the platform and read off the blade directly. If the load was heavier, he put an additional slotted proportional poise on the hanger (M). Because the compound levers were between the blade and the load, and the steelyard was between the cross head post and the hanger, the proportional poise had only to be a small portion of the load it was balancing. The combination of the moving poise L and the fixed position poise M allowed a short steelyard with 40 graduations instead of a long steelyard with 240 graduations.

What happened when the user wanted to weigh a load greater than 5 lbs. in the scoop or 40 lb. on the platform? The capacity was said to be 30 lb. and 240 lbs. respectively, but only one set of slotted poises was supplied. Looking carefully at the illustration in the Norvell–Shapleigh Hardware Co. catalogue, the weights have two numbers, one at the top and one at the bottom, $^{5}/_{40}$, $^{10}/_{80}$ and $^{10}/_{80}$. (See sketch in Fig. 11.) When the user had filled the **scoop**, he hung the necessary slotted poises on the hanger, moved the poise L and when it balanced, added up the totals of the **upper** numbers on the slotted poises (M) and the number indicated on the **upper** graduations on the beam. For example, the slotted poise marked 5 and the graduation marked 3 on the beam would indicate a total load of 8 lbs.

If the user wanted to weigh loads greater than 40 lb. on the **platform**, he used the **lower** numbers on the poises with the **lower** graduations on the steelyard. For example, the maximum capacity of

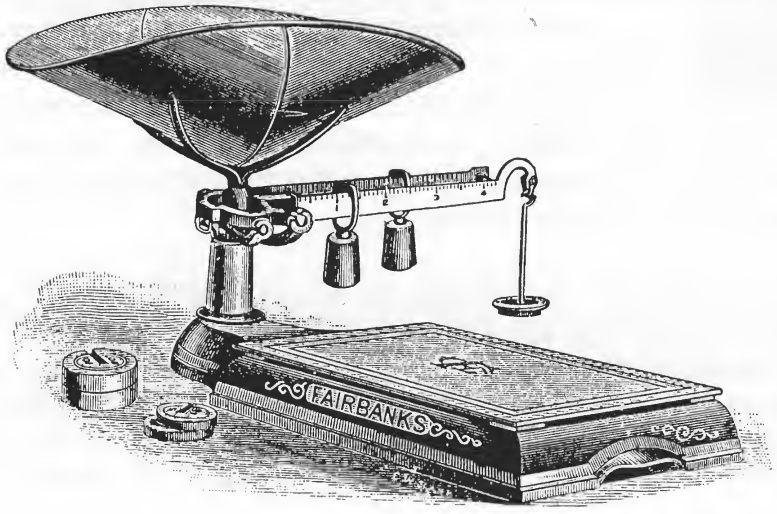


Fig. 12. Another version of the Fairbanks' Union scale, 1903. Shown in the Norvell–Shapleigh catalogue. The trader had to remember to set both poises at zero before he started to weigh, as well as remembering to use the front beam only when using the scoop, and to use the rear beam only when using the platform.

240 lbs. would be made up of three slotted poises representing 200 lbs. plus 40 lbs from the lower graduations on the beam.

By 1903, Fairbanks offered the Union Scales with a double beam, (Fig. 12) still without any explanation as to its use, in the Norvell–Shapleigh catalogue. To understand, one has to move on to the Fairbanks 1919 catalogue (Fig. 15), in which it is stated *"Double beam – front beam graduated 5 lbs. x ½ oz.; back beam graduated 40 x ¼ lbs."* So the user slid the front poise along when using the scoop, and the rear poise when using the platform, and added the slotted poises in the same way as on the single beam.

Also in the 1903 catalogue, they offer a double beam, but with two sets of graduations on the front beam. That operated in the same way as the first beam (Fig 14,) but offered the additional facility of a rear beam graduated 0–1 lb. by ½ oz, which enabled the user to ascertain small quantities accurately, presumably in the scoop.

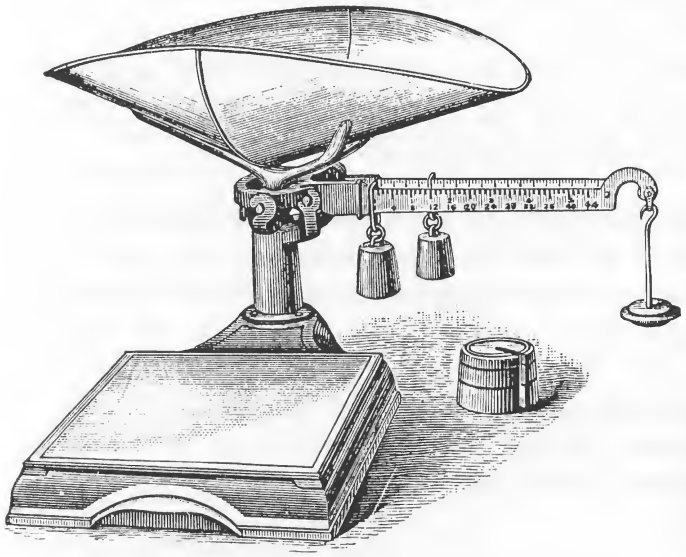


Fig. 13. Fairbanks Union Platform Scale, 1903. Shown in Norvell–Shapleigh catalogue. Third version, with the front beam having two sets of graduations, 1 for the scoop and 1 for the platform. The rear beam was graduated by ¼ oz. up to 1 lbs. The trader had to add up the slotted poises & the graduations on each beam. Note the prices of Norvell–Shapleigh.

Capacity ½ oz. to 240 lbs.

Japanned and Striped, Brass Beam.	Each
Single beam, steel bearings, with tin scoop.....	$6.00
Single beam, high-grade steel bearings, with tin scoop.....	6.50
Single beam, steel bearings, with brass scoop...	7.00
Double beam, steel bearings, with tin scoop....	8.50
Double beam, steel bearings, with brass scoop..	9.50

Average weight 52 lbs.

The 1919 Fairbanks' catalogue and the 1927 Fairbanks–Morse' catalogue extolled the virtues of their "arrow–tip beam", which replaced the swan neck of the 1906 version. (Figs. 15 and 16.) On page 8 of the 1919 catalogue they said that the arrow–tip beam prevented *"the inaccurate weights that frequently occur, due to bending of the "goose–neck" of the old style beam"*. Certainly, the swan–neck (as we call it) could be knocked a little to shorten the beam or to lengthen the beam, and thus make a false beam. If a steelyard beam was shortened, the tradesman would appear, on looking at the graduations, to be giving the full amount asked for, but in reality, he would be giving less than the full amount.

Also, as Owen put it, *Unequal–arm balances (steelyards) are not, in general, so accurate as equal–arm balances. The load arm is exceedingly short, a factor which we have shown to be detrimental to the sensitiveness of the instrument; an extremely small error or change in the length of the short arm makes a sensible error in the apparent weight of the goods weighed; and, a heavy load being balanced by a comparatively small counterpoise weight, any slight error in the weight of the counterpoise causes a multiplied error in the indications of the instrument.* So

the unscrupulous trader had two obvious ways to deceive his customer; by changing the length of the steelyard, or by filing a little something off the bottom of his poise!

The 1919 catalogue showed the scales with a new name, the "Platform Counter Scales", implying they *were* for use on a shop counter. (Fig. 16.) If that were so, the Weights and Measures Inspectors must have permitted all that careful adding up of upper or lower numbers. Were they not concerned that fraud could be practised, through carelessness or with criminal intent?

The notion that the scale was a combination of two scales had been dropped in its name.

Fairbanks offered, (Fig. 15,) a slit hoop scoop, virtuously stating that it was *"doing away with the objectionable plate and scoop balance weight, which may cause errors in weighing"*. So the version offered in 1906, *"which admits of the removing of the scoop and placing the load*

With Single Beam.

With Double Beam.

The so-called Union Scale derives its name from its form of construction, whereby coarser weighings are obtained by placing loads upon the large platform, and finer ones with the load in the scoop.

It may be provided with a double beam, as illustrated on the following page, or with a plate in place of the cross, as also illustrated, which admits of the removing of the scoop and placing the load directly upon the round plate.

Capacity, 30 lbs. x ½ oz. for the finer weighings, 240 lbs. x ¼lbs. for the coarser weighings.

Platform 10½″ x 13½″.

No.			Price.
500.	Single Beam,	Tin Scoop	$14.00
502.	" "	Brass Scoop	15.00
504.	Double "	Tin Scoop	15.00
506.	" "	Brass Scoop	16.00
508.	Single "	Tin Scoop, Two Platforms	14.50
510.	" "	Brass Scoop, Two Platforms	15.50
512.	Double "	Tin Scoop, Two Platforms	15.50
514.	" "	Brass Scoop, Two Platforms	16.50

With Two Platforms.

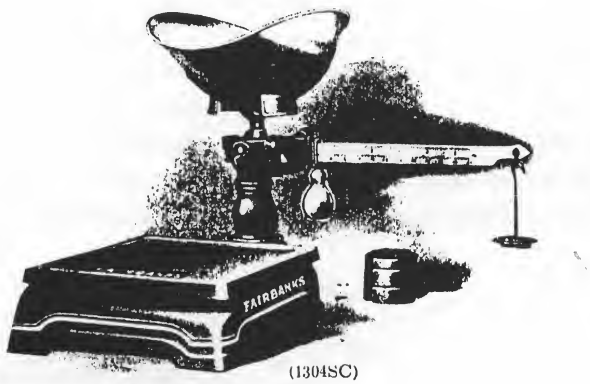
For description and prices, see preceding page.

Fig. 14. Pages from the Fairbanks' catalogue of 1906. The technical aspects of the Fairbanks' version of the Union Scale seem to be the same as those of the Fairbanks sold by Norvell–Shapleigh, but Fairbanks' own versions used different castings, which seems an expensive way of conducting business. The Fairbanks' versions had fancy fluting on the pillars, and the platforms had a slightly different shape to the gap under the base, where the hands could be slipped under the base to lift it up. There were painted lines and scroll work to decorate the base. Did these variations warrant the greater cost that Fairbanks charged? The prices were more than double those of Norvell–Shapleigh in 1903.

directly upon the round plate" needed a slotted tare poise on the hanger in addition to the other slotted poises. Fig 2 showed a tare poise already on the hanger, slotted, but with concave sides, to differentiate it from the slotted poises with a circular circumference.

Platform Counter Scales

Platform Scoop Scale with Split-hoop Scoop and Fork



(1304SC)

With Single Beam

This scale is built with a split-hoop scoop and fork, this design still allowing the scoop to be conveniently set upon a counter but doing away with the objectionable plate and scoop balance weight which may cause errors in weighing. The entire scale is a strong compact outfit, with a substantial iron frame, forming a stable base, and with pillar, and good sized platform of iron. The scoop is snugly supported in a broad fork, and is of convenient shape and ample size. Scale is fitted with tin or brass scoop as desired. Seamless scoops are regularly furnished.

The *arrow-tip* beam is of brass notched top, fitted with nickel-plated hanging poise and may be supplied either single or double, graduated as given below. A counterpoise and suitable weights, also nickel-plated, make up the full capacity. The scale is durably and attractively finished in baked enamel, maroon.

Platform Scoop Scale with Split-hoop Scoop and Fork

Code No.	Code Word	Description	Capacity	List Price
508	Baritone	Single Beam, tin scoop	240 lbs.	$18.00
510	Barkless	Single Beam, brass scoop	240 lbs.	20.00
512	Baroko	Double Beam, tin scoop	240 lbs.	20.00
514	Baron	Double Beam, brass scoop	240 lbs.	22.00

Note.—The platform on all these scales is 10½" x 13½", the **first** figure being the dimension parallel with the beam.

Capacity: 30 lbs. x ½ oz. in scoop; 240 x ¼ lbs. on platform.

Beam Graduations: Single Beam—Upper graduations 5 lbs. x ½ oz.; lower graduations, 40 x ¼ lbs. Double Beam—Front bar graduated, 5 lbs. x ½ oz.; back bar graduated, 40 x ¼ lbs.

Scoop Size: 18¼" long x 9" wide x 5¼" deep.

Fig. 15. Fairbanks & Co. 1919. The split-hoop scoop was an attempt by Fairbanks to make the customer believe that he was getting some advantage from the "new" scoop. In reality, Fairbanks were making a cheap scoop from one sheet of tin-plate or brass sheet, that could not, easily, be designed to have a flat bottom. Presumably their customers complained that the scoop needed to be set down sometimes, and that the scoop tipped over and spilled its load. Fairbanks soldered on a split-hoop so that the customer could put it down, and just omitted the platform, on which the customer could previously weigh small loads. Yes, it obviated the need for a tare weight, but it also removed one of the user's options. One must admire the copy-writer for his skill at writing 'puffs.'

It seems odd that the part that got the hardest wear, the top of the beam, was not protected by nickel, whereas the poise, that was only worn by the hand that grasped it, was nickel-plated.

The whole scale must have looked handsome with a brass beam, a brass scoop and maroon enamel.

The Platform Counter Scale was still offered by Fairbanks Morse & Co. in 1927, with the same code number, but with some new features. The ratio between the scoop and the platform had been changed from 30:240 to 25:250. That may have seemed a small change to Fairbanks Morse's customers, but it had needed mathematical calculations in the design office and new castings at the factory.

The beam was still made of the relatively soft brass, not protected by hard nickel. The top of the beam was no longer notched, which meant less wear, but also meant that the placing of the poise was less obvious to the trader.

Fig. 16. Fairbanks Morse & Co. catalogue, 1927.

Platform Scoop Scale with Patented Split-hoop Scoop and Fork

With Single Beam (1504SC)

This scale is equipped with a split-hoop scoop and fork, this design still allowing the scoop to be conveniently set upon a counter but doing away with the objectionable plate and scoop balance weight which may cause errors in weighing. The entire scale is a strong compact outfit, with a substantial iron frame, forming a stable base, and with pillar, and good sized platform of iron. The scoop is snugly supported in a broad fork, and is of convenient shape and ample size. Scale is fitted with seamless tin or brass scoop as listed.

The *arrow-tip* beam is of brass, smooth top, fitted with sliding poise and may be supplied either single or double, graduated as given below. A counterpoise and suitable weights, nickel-plated, make up the full capacity. The scale is durably and attractively finished in baked enamel, black.

Platform Scoop Scale with Split-hoop Scoop and Fork

Code No.	Code Word	Description	Capacity	List Price
508	ZEMIK	Single Beam, tin scoop.....	250 lbs.	$18.00
510	ZEMJL	Single Beam, brass scoop.....	250 lbs.	20.00
512	ZEMKM	Double Beam, tin scoop.....	250 lbs.	20.00
514	ZEMLN	Double Beam, brass scoop.....	250 lbs.	22.00

Note.—The platform on all these scales is 10½" x 14", the **first** figure being the dimension parallel with the beam.

Capacity: 25 lbs. x ½ oz. in scoop; 250 x ½ lbs. on platform.

Beam Graduations: Single Beam—Upper graduations 5 lbs. x ½ oz.; lower graduations, 50 x ½ lbs. Double Beam—Front bar graduated, 5 lbs. x ½ oz.; back bar graduated, 50 x ½ lbs.

Scoop Size: 18½" long x 9" wide x 5½" deep.

The poise was no longer hanging, but was a sliding block, which produced a slightly different centre of gravity , depending on how far along the beam the poise was.

Fairbanks Morse's clever copy–writer may have liked the scale with black enamel, but one is reminded of Henry Ford's infamous remark that *"they can have any colour as long as it's black."*

One thing we can say about Fairbanks – they expected their users to keep a clear head!

Bibliography

Brauer, E The Construction of the Balance, published by the Incorporated Society of Inspectors of Weights and Measures, 1909

E & T Fairbanks and Company, St. Johnsbury, Vermont catalogue, 1859, ISASC reprint.

E & T Fairbanks and Company, St. Johnsbury, Vermont catalogue, 1906, ISASC reprint.

Fairbanks Company catalogue, 1919, ISASC reprint.

Fairbanks Morse & Co, St. Johnsbury, Vt, & East Moline, Ill. catalogue, 1927. Privately owned.

Norvell–Shapleigh Hardware Co, St. Louis, catalogue, 1903

Owen, G A A Treatise on Weighing Machines, London, 1922.

PS. Please will the owner of the Fairbanks Morse catalogue inform the editor of his ownership, so that a note may be kept of the original source. His name will not be given out, if he prefers to remain anonymous.

Thanks are given to Ted Stein and to the owner of the Fairbanks Morse catalogue. Without their help, EQM would contain even fewer American articles.

Response to Review

By M Stevenson

In view of your long and, as you say, "overly critical" review of the revised Shire Album 55, **Scales and Balances**, I hope that you will now allow me a little space to counter much of the criticism and restore some credibility to the contents of this popular little handbook.

When preparing my reply to the charge that the contents were of dubious reliability, I began by dealing with each point of disagreement in turn, but when this looked like turning out to be almost as long and tedious as the review itself, I abandoned it in favour of some general comments and a few examples.

Most of the criticism seems to me to consist of nothing more than (1) speculation on the possibility of dates being earlier than those assigned to the scales illustrated; (2) suggestions for the addition of background material which, if adopted, would seriously interfere with the tight format; (3) disagreement with some of the author's opinions; (4) quibbles over the precise meaning of words.

To give a few examples from the first paragraph of the review: the dating of the Oertling beam to "About 1880" is disputed on the grounds that it *"might have been made as early as 1850"*; the (correct) description *"detachable knife-edges"* is said to be a *"little misleading"*, why?; we are told that the knife-edges were actually *"sharpened planes"* and very firmly, *"not knives that were slotted into the beam laterally."* Who said they were? Finally, we are informed that the end bearings were *"semi-relieved"* as *"they rested lightly on the box when not in use"*! This would be excusable if it had not been written by someone who concludes an intemperate review with the words, *"It* (the review) *is a plea for accuracy with brevity, precision, when it costs no more than woolly remarks."*

I was sorry to know that the warnings against the purchase of scales with parts not matching, with damaged or missing bearings or cracked pans left the reviewer gasping. For my part, I was astonished to learn that four out of five of all scales collected by ISASC members were defective or imperfect in some way. In my own small collection of some 30 or so scales, I estimate the proportion the other way round, i.e. four out of five perfect after allowing for normal wear in use. Maybe Tom Graham was rather too meticulous after spending much of his working life, like me, examining and testing traders' scales, but it is a well-established principle in antique collecting that damaged or defective items should be avoided.

Although I could go on to contest most of the doubts cast on the contents in the following fifteen paragraphs, I shall quote only one other example to show how far the reviewer is prepared to go to disparage a small booklet with a text little more than one half the length of one issue of EQM. At the beginning of paragraph 8, the statement that the auncel was condemned in 1429 is quoted, and then followed by "but it was the user who was excommunicated, not the auncel that was cursed." If we are to have semantics of this sort, can we now look forward to a change in the name of our Society to the International Society of Collectors of Antique Scales? After all, not all members are, like me, Antique Scale Collectors.

From the reviewer, D Crawforth-Hitchins- I did go "over the top", for which I apologise, but I stick to my guns about the need for accuracy, particularly about dates. Maurice was not responsible for Graham's omissions, or for Shire Publications' attitude that revising can be done in a week or so. I do like the book. I also like ISASC members to be as well educated as possible. Many little asides were included to expand people's enthusiasm for the objects. Maurice might like to re-read the compliments that I included.

Reaction to Review

By B J Oliver

I am sure that you will agree that one of the great difficulties in researching any subject is the large amount of erroneous information that abounds, waiting to trap the unwary, and even the wary at times. I feel that I should point out that you not only created an erroneous date in the last EQM, but you compounded your error by putting it forward as a "correction" to a correctly quoted date! In your review of the new edition of J T Graham's **Scales and Balances** you say, on page 1791, that Oertling became a limited company in 1880. In fact the true date was 1919, as stated by Graham. This is a date which has always been clear; it is not one of those difficult disputed dates. The late Mr. Graham deserves an apology in the next EQM, don't you think?

While I am here, so to speak, perhaps you might like some extra information on the point at issue. L Oertling was converted into a private limited company in 1919 with a nominal capital of £20,000 (£8,000 paid up.) Why? The sequence of events seems to go as follows. The founder of the company, Ludwig Oertling (1818–1893) gave his only son, Henry, both a university education and a practical apprenticeship in the works. Thus Henry was fully groomed for the job of running the company when the time came. In his turn he educated his own son, Lewis, in like manner. Then came the Great War. The Oertling family were very patriotic about their adopted country. Lewis volunteered for the army, was commissioned in 1915, was seconded to the newly–formed Royal Flying Corps, was shot down in August 1918, and died soon afterwards. This knocked the stuffing out of Henry, now aged 70, so that he lost interest in the business, declined and died in 1921. It would seem that Henry's son–in–law, Malcolm Dunbar, and Lewis' god–father, Francis Nalder, were really running the show and took the decision to float the company in 1919. Foreign balances were flooding into the country once more, in spite of the Key Industries Duty, profit margins were tight, and the company was very short of cash; this was probably the real reason for the floatation.

Then in December 1921, two things happened; Henry died, and a week later, the leases on the factory ran out. (Astonishingly, the landlord was Henry's own sister, Amelia!) Henry's widow, Oenone, joined the board, and an extension of the lease was arranged for another seven years. It seems that Oenone was soon losing enthusiasm, finances were still a struggle, and it has been said that Dunbar arranged for the company to be sold to the Soho Trust Company for £8,700 in 1924, with himself installed as Managing Director. The Soho Trust is, of course, Avery. Dunbar continued as Managing Director until his retirement in 1947, thereby breaking the last link with the Oertling family. Although, to the outside world, it was still an active, independent company, L Oertling Ltd., it was an Avery–driven operation, from 1924 onwards. From 1928 onwards the production facilities were slowly integrated with those of another recent Avery acquisition, DeGrave, Short and Co Ltd, although each was still conducting independent sales operations.

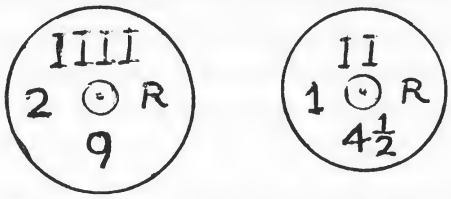
From D Crawforth–Hitchins; I had gone to our card–index to verify the dates, when I wrote the review, and used the date that Michael had written there. BUT Michael had not recorded his source, an error by any researcher, as nobody can go back to find out why he put that date. As researchers, we learned better habits as we understood the importance of sources.

I do sincerely apologise, both to Tom Graham, the original author, and to Maurice Stevenson, who feels that I found too many faults. I hope that all ISASC members will remember the correct date.

English Colonial Scales, Part 2

More evidence. By G ZAVATTONI

I purchased a shagreen case, bearing the label of Walter Phillips. It has the same label as the one on page 1783. The case has four weights inside for the 8 reales, 4 reales, 2 reales and 1 reale.



The 8 and 4 reales bear no mass or value marks, but the 2 reales has: IIII 9 and the 1 reale has II 4½. According to your article, I therefore understand that they were made for the Irish market.

More evidence. By G HOUBEN

I have two coin weights like the ones that were on page 1784 of EQM. The 8 reales has XVII ½, the arms of Leon, HORTYZ, and an unidentified stamp. It has a mass of 26.8 g. Hermano Ortyz lived between 1580 and 1634 in Spain. According to F Lavagne, H Ortyz was an adjuster around 1600. Mateu Y Llopis did not know this type of weight, and they are not present in the collection of Madrid.

The 4 reales has VIII 18, the arms of Leon, and an unidentified stamp. It has a mass of 13.3 g. These coin weights were obviously used and adjusted in Spain, but there is no correlation between 26.6 g and the official pound and dinero of Leon and Castile.

I can add to the puzzles with two square weights, stamped XVIID 18G, and VIIID 9G, respectively. The lion mark *might* be Scottish. The tail of the lion curls in towards his body. Were these weights also for reales?

Comment by the Editor

The idea that these knobbed weights were being made before 1634 surprises me. Could it be that the mark HORTYZ was inherited, being passed down through a family, as happened in Nürnberg? Were such weights made before 1634, and later on, in Spain, added to boxes made around 1700 in England? If so, how did the English makers know what size to make the circular pens for each weight? Why did the Spanish adjuster permit weights stamped with English pennyweights and grains?

The mark of the lion rampant on the square weights is not quite like the mark used on Scottish weights seen by the Withers, page 333. The lion that they illustrate has his tail curled more or less parallel with his body, and set in an oval cartouche. This does not mean that other adjusters did not use other marks, of course. [My Scottish coin weights are stamped with a thistle mark.]

More evidence would help to unravel this mystery. Please help.

Roman Steelyard ?

By A V Simcock

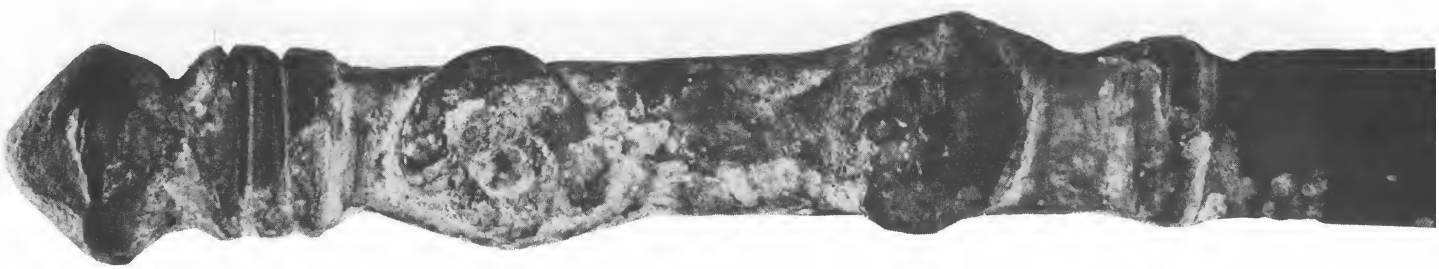
The Museum of the History of Science in Oxford recently acquired this part of a steelyard, thought to be Roman, but so incomplete that one cannot be categorical. [Accession number 19–25.] The copper alloy (bronze?) beam is 5½ inches (140 mm.) long, and ¼ inch (6 mm.) deep. Being such a narrow beam, it might have had a capacity of about 20–30 lbs. (to express it in British terms.)

It has graduated slashes marked on two surfaces of the diamond–section beam. The slashes appear to be on the under side of the beam, until one uses the beam with the right hand, so that they show on the upper surface. We are accustomed to steelyards that were for use with the left hand. Does this indicate a particular culture that used the steelyard in the right hand?

The graduated slashes have 3 birds' eye circles at the tenth unit on both surfaces, so, if the steelyard started at zero, (which it may not have done,) then the numbering system was a decimal system. Being a turn–over steelyard, we tried to relate the two sets of graduations to each other. We marked out the pivot points and the slashes on each side, and, as nearly as we could ascertain, the lighter side had a ratio of 7:1 and the heavier side had a ratio of 17:1. The positions of the graduations were very close to each other, the 10 of one side being about ¼ inch (6 mm.) from the 10 on the other side. So the units on the heavier side were about 2.4 times those of the lighter side. Without the poise & the hooks, we cannot define the units, but we would like to know of any culture that used two systems with roughly that relationship. Can ISASC members help?

Light

Heavy



Review

Handlist of Scientific Instrument-Makers' Trade Catalogues, 1600-1914. By RGW Anderson, J Burnett and B Gee. Paperback, 100 pages. Published by the National Museums of Scotland in association with the Science Museum, London. Published Edinburgh, 1990. ISSN 0952 7737. £10.50.

This alphabetical list is, regrettably, the first British compilation of SI trade catalogues, based on the hard work done by Brian Gee during the early 1980s, and, independently, by John Burnett in the late 1980s. Scale collectors will not need to be told how important catalogues are in dating instruments, assessing the range and quality of a makers' products, understanding usage and helping to find out when new ideas were actually made available to the general user. ISASC members have had these methods applied to every EQM since its inception, and members know that the knowledge displayed by almost every author comes from a combination of handling the artefacts and connecting them to the documents. The admirable reprints published by ISASC demonstrates the great importance that we place on catalogues, so ISASC members will find it surprising that the authors of this book felt any need to spell out their Handlist's importance.

The Handlist contains 1570 catalogues, of which 1,185 are known only from a single surviving copy. This highlights their rarity, and validates the huge amount of work that has gone into this compilation. Each entry gives the title, name and address, edition, date, (exact or estimated,) number of pages, location of catalogue and comments. Each entry takes up about 7 lines. Because many catalogues were published as "tempters", the contents may have covered more instruments than were normally made by that maker, and many entries are too comprehensive to be helpful. For example, "Scientific Instruments," "Laboratory equipment," "Mathematical, Philosophical and Optical Instruments," or "Engineering instruments," give little idea as to whether balances were made by those makers. This leaves the reader to decide whether to chase the catalogue to examine it.

The catalogues are mainly British, but there is a good selection of American ones, with a few French and German ones, etc, because of the co-operation of libraries and museums in Britain, USA, Austria, France, Germany, Ireland, Italy and the Netherlands. In no instances do the authors claim that they have found all surviving catalogues. In fact, they optimistically invite readers to send additional information so that a much more comprehensive second edition can be published. Personally, I regret that they have excluded reprints, (except for a few photocopies,) as the reprint gives the same information as the original, and is just as useful, and handling the reprint has the advantage of not causing deterioration of the original. A reader who does not know of a reprint may be blocked from obtaining valuable knowledge. I would have been delighted if the 4½ blank pages had been used to list another 90 catalogues, known to Burnett, but not included because he was instructed (by whom?) to work to a target number of entries.

The authors have followed the convention that has grown up over the last fifty years, of encompassing instruments used by scientists in laboratories, by lecturers explaining science, by students and by industries needing precise measurements. They have excluded photographic and medical instruments, because those fields are studied separately, and have their own handlists.

So which scale makers/ retailers are included? Many men who made balances did not include a clear description in their catalogues, so the catalogues would not always be useful to ISASC members.

Makers of Balances, Scales and Weights contained in the Handlist

A Abrahams & Co	Liverpool	1855
Frederick Accum	London	1804, 1805, 1817, 1819
George Adams II	London	1753, 1756, 1766, 1769, 1770, 1771, 1772, 1774, 1777, 1782, 1784, 1785, 1787, 1789, 1790, 1791, 1795, 1814
Aston & Mander Ltd	London	1910
Baird & Tatlock	Glasgow	1885, 1902, 1912
Baird & Tatlock	London	1897, 1901, 1904, 1906, 1908, 1910, 1911, 1912, 1914
F E Becker & Co	London	1884, 1900, 1902, 1903, 1905, 1913
August Bel & Co	London	(Selling stock of A & M Zimmerman,) 1877, 1880,
Brady & Martin	Newcastle	1892, 1900
Braun-Knecht-Heimann Co	San Francisco	1910
Breithaupt	Cassel	1835, 1891
Paul Bunge	Hamburg	1893
William Cary	London	1827, 1832
Joseph Casartelli	Manchester	1876
L P Casella	London	1860, 1866,
L Casella	London	1871, 1874, 1875, 1880, 1887, 1895, 1898, 1900
Collet Frères	Paris	1855
J B Dancer	Manchester	1855, 1873, 1874
George Dollond	London	1825, 1830, 1831
Dring & Fage	London	1870, 1911
William Elliott & Sons	London	1851
Elliott Bros.	London	1856, 1860, 1862, 1864, 1867, 1869, 1870, 1872, 1874, 1876 1879,1895, 1897, 1899
G Fontaine	Paris	1891
William Fraser	London	1785
A Gallenkamp & Co	London	1900, 1902, 1907, 1911
W & J George	London	(Trading as F E Becker & Co,) 1900, 1902, 1903, 1905, 1913,
Richard Griffin & Co	Glasgow	1844, 1845
John J Griffin & Co	London	1849, 1850, 1852
John Joseph Griffin	London	1854, 1856, 1858, 1861
John J Griffin & Sons	London	1861, 1866, 1868, 1873, 1875, 1877, 1884, 1889, 1892, 1893
J J Griffin & Sons Ltd	London	1894, 1897, 1899, 1900, 1901, 1902, 1905, 1906, 1907, 1910 1912
W & L E Gurley	Troy	1873, 1878, 1888, 1893, 1895, 1897, 1899, 1905, 1907, 1908 1909, 1910, 1912, 1914
Philip Harris & Co	Birmingham	1875, 1886, 1889, 1893, 1902, 1903
Philip Harris & Co Ltd	Birmingham	1906, 1908, 1911, 1912
P Harris & Co (1913) Ltd	Birmingham	1914
James How	London	c 1860, c 1870, 1875
Fredk Jackson & Co Ltd	Manchester	1908
Wm. & Sam Jones	London	1792, 1793, 1795, 1797, 1798, 1801, 1803, 1805, 1810, 1811 1813, 1814, 1815, 1817, 1818, 1825, 1826, 1830, 1831, 1836 1837, 1838, 1843, 1850, 1855
Richard & Geo. Knight	London	1811, 1816, 1834
Jos. M Maiben & Co	Dublin	1913
Benjamin Martin	London	1761, 1768, 1780

continued....

Negretti & Zambra	London	1859, 1864, 1871, 1874, 1878, 1885, 1900
Guiseppe Nemetz	Vienna	1885
John Newman	London	1822, 1827, 1836, 1837, 1845
Ludwig Oertling	London	1885
Robert W Paul	London	1892, 1896, 1898, 1903, 1904, 1912, 1913, 1914
N C Pixii	Paris	1832, 1833
Pixii père & fils	Paris	1835, 1838, 1842, 1845, 1849
W G Pye & Co	Cambridge	1903, 1909, 1911, 1914
James W Queen & Co	Philadelphia	1856, 1860, 1862, 1867, 1868, 1870, 1871, 1872, 1873, 1874 1875, 1876, 1877, 1878, 1880, 1881, 1882, 1883, 1884, 1886 1887, 1888, 1889, 1890, 1891, 1892, 1893, 1894
Queen & Co	Philadelphia	1895, 1897, 1898, 1890, 1893
W Reeves & Co	London	1914
Reynolds & Branson	Leeds	1893
Reynolds & Branson Ltd	Leeds	1900, 1914
Thomas C Robinson	London	1828, 1829, 1842
Standley, Belcher & Mason	Birmingham	1902
Townson & Mercer	London	1874, 1878, 1880, 1884, 1888, 1892, 1895, 1901, 1906, 1908 1912
Townson & Mercer Ltd	London	1914
Troughton & Simms	London	1829, 1834, 1836, 1837, 1840, 1842, 1844, 1852, 1864, 1889 1898, 1900, 1908, 1909
Watkins & Hill	London	1828, 1832, 1836, 1838, 1845
Jas Wooley Sons & Co,	Manchester	1891
Jas Wooley Sons & Co Ltd	Manchester	1911
Alexander Wright & Co	London	1906
Yeates & Son	Dublin	1877, 1880, 1883, 1887
A & M Zimmerman	London?	(Sold off by A Bel & Co,) 1877, 1880,

Compiling this list points up the dates at which companies changed their names. It is useful to know that, for example, J J Griffin & Sons became a limited company in 1893/4, that Pixii junior joined his father between 1833 and 1835, and that Townson & Mercer became a limited company between 1912 and 1914. That information might date one of your balances with greater accuracy.

It is surprising that so few of these makers *specialised* in making balances. Only F E Becker & Co, August Bel & Co, (selling off the stock of A & M Zimmerman,) Paul Bunge, Collot Frères, G Fontaine, Guiseppe Nemetz, L Oertling and James W Queen & Co published catalogues specifically of balances, (and some of them published separate catalogues of other instruments.)

The general picture that builds up is of a thriving industry that had many customers "out of town" who needed to order stock from a catalogue, or who needed a catalogue to help them in discussions about their future purchases, perhaps with a Board who controlled their spending. The customers were buying balances amongst many other measuring instruments, and had very precise needs for balances of various grades of accuracy, ease of access and capacity.

Every reference library should stock this book, and, if your local reference library has not got it, order the book now and make sure that it is available for all future research. Serious researchers should own this book, and assist the authors by sending their additions to John Burnett at the National Museum of Scotland.

D F C–H

Irish Makers/ Retailers, Pt. 3 By D Crawforth-Hitchins

Robert Jeffers working 1769 – 1770

1769–1770 Cow Lane, Dublin

Robert Jeffers was recorded in Trade Directories as a scale and beam maker at Cow Lane in 1769 and 1770.

No work is known.

Vincent Kidder freed 1690 –died 1735

Dublin

In 1697/8 Vincent Kidder was proclaimed to be the Official Maker of Weights, as successor to Cuthbert and Paris. Each weight was stamped with the number of pennyweights on one side in very small numerals under a harp. (The crown was no longer above the harp, so the harp was more central.) The King's arms [William III] were on the reverse, with the date on the larger weights, and to be sold at not more than fifteen pence for the set of weights, eight in number.

Kidder got the job after Cuthbert and Paris were disgraced, but was Kidder so much more accurate? His 1697 weights reveal losses of 4, 4, 8, 3½, 4, 4¾ and 6½ grains, (omitting the one that had lost 17¼ grains.) This averages out at 3½ grains per coin weight, on the 9 surviving 1697 ones. The authorities would have done better to have kept Cuthbert and Paris on that showing.

Fig. 32. Weight for 8 Reales by Kidder. 4 grains light. The Coat of Arms was so complicated that it was very difficult to fit on so small a circle. Withers' photo.

He had previously been fined, in 1691, for working bad silver. As a goldsmith with a seven year apprenticeship, he should have known better. Could he have been a dishonest man?

Kidder made many sets in 1697, 1698, 1709, 1714, 1718 and 1725. He got more accurate, with 1¼ grains' loss on average, but individual weights were unreliable. There were weights with losses of 15, 4¾, 8½, 5¾, 5¾ and 4¾ grains. There were other weights that were overweight, even after use, by 10½, 1¾, ¼, ¼, and ½ grain. When I first studied these inaccuracies, I thought that it must be difficult to make them accurately, and that wear must account for much of the loss, but, after studying all the later makers, from Henry Archdall on, I concluded that Kidder was a sloppy maker, with his fluctuations in weight, with many weights not centrally struck on the blank, and with his continued use of a cracked die. See Fig. 32. See Withers no 2701 and others struck with the same die. A weight for 8 reales of 1698, sold by Numismatica, Wein in 1974, reinforces this view. It was 10 grains under-weight.

The obverse of one of his dies, for the quadruple pistole, which he made in 1714, was later used by William Archdall for his weights of 1737. Was there some system whereby Official Weight Makers' dies were passed on, or had Archdall bought the die, as obviously useful, when he became the Official Maker?

To quote page 296 of the Withers' book, *"As well as the denominations listed in the 1709 proclamation, weights occur dated 1709 for the new French louis and its fractions which were not proclaimed current until 1714, though the coins themselves were produced from 1709. Also*

dated 1709 are weights for the escudo series of Portuguese coins which were not issued until 1722. There are two proclamations for these weights, each stating a different weight at which the coin was current, one of 1725 and the other of 1737. All weights bearing the date of 1709 are listed here, although it is obvious that some must have been produced after 1725 and 1737." This information must be kept in mind when looking at dates on weights.

The 1709 set included weights for the Moidore, the Spanish/French Pistole, the Ducatoon and the old Reales. This list is interesting in that the coins were different from the coins current in England in 1709. In English coin scales of 1700 to 1710, the weights would have been for the French Pistole, the English Guinea and sometimes for the silver Crown, half crown, shilling and sixpence. As referred to above, Kidder added the new coin weights later, for the French Louis d'or and for the Portuguese Piece.

Under Withers' photograph of the French ecu d'argent, weighing XIX D 14 G 8 M, they comment *"The M indicates 'mite' = 1/20 of a grain. However, in view of the fact that the piece is 14 grains light, this intimation of accuracy is laughable."* My thought was that anyone using a coin weight that was 14 grains underweight was going to loose a penny on every transaction using that coin weight. Not funny, when a penny would buy a very big loaf made of fine white flour.

WL working after 1762

Ireland??

According to Sheppard and Musham, WL made Irish money weights, but the surviving quarter guinea weight that they discuss, was valued at 5/3, the English value, and not 5/8¼, the Irish value, so we must be dubious as to whether WL was Irish. They describe it as *"WL in double script, monarch? on obv. Rev 5 S 3 D and 1 D 8¼ G"* 1762 was the first year that the quarter guinea was minted.

Lee working c 1830?

c 1830? 74, High Street, Belfast

Lee, jeweller, optician etc., of 74, High Street, Belfast, sold folding sovereign balances, presumably imported from England.

John Locker freed 1759–died 1825

1772 5, Parliament Street, Dublin

1782 24, Marlborough Street, Dublin

John Locker was freed from William Williamson in 1759, was Warden of Goldsmiths' Company in Dublin in 1775 to 1778 and Master of Goldsmiths' in 1779/80. Trade directories gave his dates, occupation as a goldsmith, and addresses.

He was legally able to make weights for guinea and its fractions, and weights for pennyweights in 1775, but would have infringed James Warren's rights if he had made weights for foreign coins. A light guinea weight with *'I Locker 1775'* was recorded by Sheppard and Musham, and one recorded by Westropp. Withers record six more weights, all very accurate weights, and nicely designed with very stylish numbers. (I am indebted to the Withers for all the information on Locker.)

Fig. 33. Guinea weight by I. Locker. Withers' photo.

Richard Lord freed 1657 – died 1692

Copper Alley, Dublin

Richard Lord was a Goldsmith and Sworn Assay Master of Dublin from 1670 until 1692. Presumably his weights were of his own design, as there was no requirement at that date to use a specified design. The weights had the Arms of the City of Dublin in the centre, (three castles, one below the other two, each with two towers with three crenelations sticking up like fingers, two windows in the connecting curtain wall and a large archway in the centre of the curtain wall.) The Arms were surmounted by a large **CD,** (for City of Dublin). Round the edge was BY RICHARD LORD ESSAY MR, On the reverse were six lines of writing, stating *THE * WEIGHT: OF FOVRE SHI NINE PENCE XVII D *1670*. (See Fig. 34.) The weight was 15½ grains underweight, so great a loss that it might have been altered intentionally. Withers no. 2565.

Fig. 34. Weight for 8 Reales, dated 1670. Withers' photo.

The reverse of his 2 reale weight had NE ADDIAS NEC: DEMAS IIII D VI G 1670, and had a grained edge, (grooves cut close together.) The Withers comment, *"The edge of this piece is grained. The piece was struck from a cast blank, the edge graining incorporated into the mould. The practice seems to have been applied only to a very few weights, so perhaps it was found to be too difficult or time–consuming to prepare blanks of an accurate weight with this edge."*

John Lort working 1767–1782

1767	Walker's Alley, Dublin
1777–1778	8, Exchange Street, Dublin
1779–1782	Plunkett Street, Dublin

John Lort put an advertisement in the Dublin Mercury in 1767, stating that he was a mathematical instrument maker in Walker's Alley. He was in Trade Directories in 1777 and 1778 at 8, Exchange Street, and from 1779 to 1782 at Plunkett St. No work is known except the rocker below.

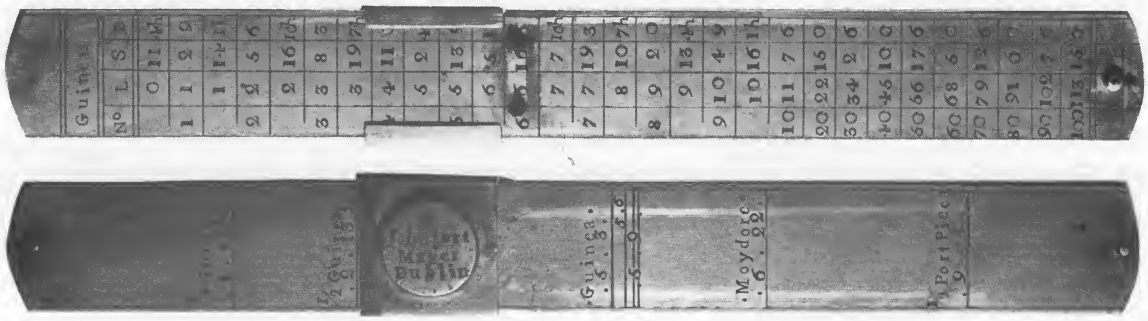


Fig. 35. This coin rocker was made during a flush of enthusiasm for new scales to weigh coins, triggered by the Great Recoinage, and the Proclamation of the New Standard of values for guineas in 1774.

A brass coin rocker marked "Iohn Lort, Maker, Dublin" is a most interesting and rare piece. It is a 5½ inch (135 mm) long beam, with two pins protruding underneath, slightly off centre, and a brass sliding saddle moving right along the length of the rocker. Both top and bottom surfaces were curved. It was engraved underneath with a ready–reckoner for the Irish monetary values of the ¼ guinea up to 100 guineas, as proclaimed in 1737. The top surface was engraved with lines against which the saddle was aligned, for the ¼ Guinea 1.8¼; ½ Guinea 2 13½; Guinea 5.3 (and

lines for 5.6, 5.8 and 5.9); the Moidore 6.22 and the ½ Portuguese Piece 9.6. Because the Guinea lines include a line for the 5.8, it was made after the Proclamation of the New Standard in 1774 which stated the least current weight at which Guineas of various ages could pass.

Maguire & Gatchell working 1897 – 1910 on
1897–1910 7, Dawson Street, Dublin

They were in Trade Directories as ironmongers, plumbers and beam and scale manufacturers at 7, Dawson Street, from 1897 to 1910.

They became a limited company some time between 1910 and 1962. No work is known.

Maguire & Gatchell Ltd working ?– 1962
7, Dawson Street, Dublin
10, 13, 14 & 15, Dawson Street, Dublin

Even in 1962, they were still classified as ironmongers, plumbers and beam and scale manufacturers, but by then they had moved to 10, 13, 14 & 15, Dawson Street, Dublin.

No work is known.

Joseph M. Maiben & Co. working 1912 – 1922
1912–1914 11, Westland Row, Dublin
31, Eden Quay, Dublin

Joseph Maiben was a maker/ supplier of scientific instruments. He sold a precision balance labelled *"H. L. Becker Fils & Co, Bruxelles, en France Henry Louis Becker"* and additionally *"Made in Belgium. E. L. de Reede succr. Joseph M. Maiben & Co. Dublin."* (See Mollan.)

An illustrated catalogue of 1913 contains descriptions of chemical, biological and bacteriological apparatus, lecture and general elementary physical apparatus, balances and weights, sold by Joseph M Maiben & Co, 11, Westland Row, Dublin, dated on the spine 1914. It has 560 pages, and is owned by the Royal Dublin Society.

W Mansfield 19th century?
19th century Grafton Street, Dublin

W MANSFIELD, GRAFTON ST, DUBLIN, was inscribed on the beam of a plain roberval postal scale. Many Birmingham brass founders made simple robervals that were retailed by numerous outlets. This roberval might have been made by Mansfield, but it is more probable that he was a retailer.

Thomas Mason working 1900 – 1916
1900–1916 5, Dame Street, Dublin

Thomas Mason, optician, made/ sold many sorts of scientific instruments, as had his predecessors, various Masons of Dublin.

Mason sold a magnetic balance made by Robert W. Paul of London. The magnetic balance was labelled *"Rob^{t} W. Paul, London N"*. and *"T. Mason, 5 Dame St. Dublin, – Magnetic Balance (McEwen Pattern) Patented."* (See Mollan.)

Mason also sold a balance by L Oertling. It was a scholars' chemical balance on a mahogany base, with a handle on the base to raise the beam. (See Mollan.)

Mason also sold a high quality precision balance with "*Wilh. H F Kuhlmann Hamburg.*" and "*T Mason 5, Dame Street, Dublin*" marked on it. (See Mollan.)

Lewis Moore working 1769 – 1774

1769–1774 Fisher's Lane, Dublin

Lewis Moore, beam and scale maker, Fisher's Lane in Trade Directories between 1769 and 1774.

No work known.

William Moore working 1771 – 1791

1771–1772 85, Dawe Street, Dublin
1772 Crampton Court, Dublin
1774–1777 1, Capel Street, Dublin
1777–1780 1, Capel Street and 39, Temple Bar, Dublin
1782 4, Essex Bridge, Dublin
1782 20, Temple Bar, Dublin
1791 2, Abbey Street, Dublin

Westropp recorded Guinea weights marked *"W^m Moore, 1, Capel Street"* and stated that he was at that address from 1774 to 1781. William Moore, jeweller, had all the addresses listed above. The reason for such restlessness is unknown!

The Withers record two guinea weights, both rectangular, with the corners polished off to make very elegant shapes. One guinea was for old guineas still in use after 1774, being 5 pwt 6 grs, and the other weight for a guinea minted after 1774, and so only legal tender if it was over 5 pwt 8 grs. See Withers no. 2800 and 2801.

Fig. 36. Guinea weight by W Moore. Withers' photo.

Neill Brothers working 1852

1852 23, High Street, Belfast

The Neill Brothers, John R Neill and James Neill, of 23, High Street, Belfast, sold folding sovereign balances. They put an advertisement in the 1852 Directory of Belfast.

Robert Neill working 1819–c.1847

1819–c. 1847 25, High Street, Belfast

Robert Neill was a clock–maker, apprenticed in 1791, working independently from 1819, until he took his sons into the business after 1847. A retailer of scales, Robert Neill had his own label printed to fit into a folding guinea and sovereign balance, *"Warranted and sold by Robert Neill, 25, High Street, Belfast."*

The folder was an equal–arm balance with an H shaped hanger at both ends, a circular pan with a rim, on the left–hand side, to take the weight, and a spade shaped plate at the right–hand end to take the coin. More commonly, equal–arm beams in folders were made of round–section steel, but Anthony Wilkinson, H Bell & Co, John Whitley and Daniel Robinson made them with a brass beam of rectangular section, as this example was. On the right of the central pivot there was a slide, (a flat rectangle of brass wrapped round the beam, with a springy catch cut in its front

edge,) which was used if the coin did not lower the plate down to the lid. The slide was moved towards the end of the beam until the coin did drop, then the number stamped on the beam beside the slide indicated how many pennies–worth of gold were missing from the coin. (See Fig. 37.)

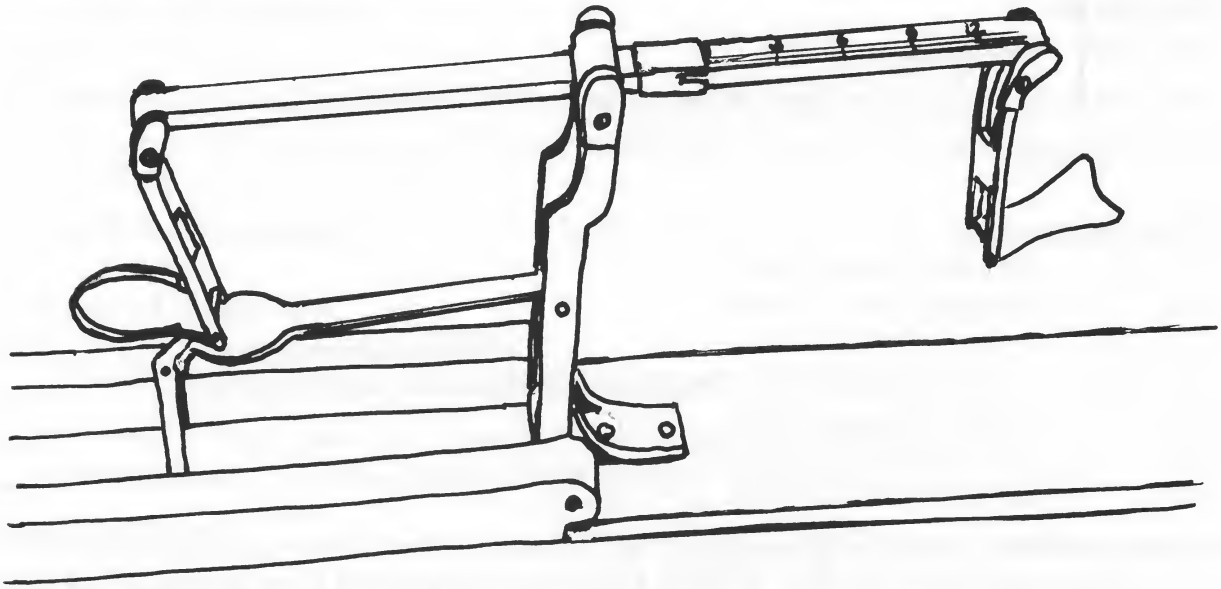


Fig. 37. Folding guinea balance of the type made by H Bell & Co. Retailed by Robert Neill.

The rare weights were compound weights, of the type made only by Hamlet Bell & Co, of Prescot, Lancashire, England, working between 1820 and 1835. (See Fig. 38.) To condense the weights for the five coins current in Britain, Bell made a small weight with a long central stalk of 1 pwt 18 grains, that balanced the 7 shilling piece, which was first minted in 1797. He made a small disc with a hole in it, which slotted on top of the 1 pwt. 18 gns, making together a weight of 2 pwt. 16 gns, to balance the half guinea, minted from 1774 onwards. Then he made a larger disc, weighing 2 pwt. 16 gns, with a central hole, which, when slotted on top of the others, made up the weight 5 pwt. 8 gns, to balance the guinea minted from 1774 onwards. [Guineas and half guineas were minted long before 1774, but after the recoinage of 1774, the weight at which they could legally pass was set at 5 8 and 2 16.] Likewise, he made a small weight with a central stalk to balance the half sovereign of 2 pwt. 13 gns, just marked ½ S, and a disc with a central hole, which slotted on, to bring the weight up to 5 pwt. 2 gns, to balance the sovereign.

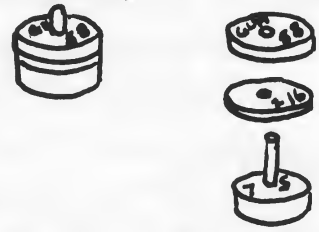


Fig. 38. H Bell & Co.'s rare compound weights.

This design of weights was only seen twice by Crawforth in all his years of research into these folders, and so must be considered very rare.

J. Newman working circa 1840 – 1914

156 Capel Street, Dublin

J. Newman's had their own (undated) catalogue, offering scales, weighing machines, weigh–bridges, weights, beams, counter scales, chemist's scales and steelyards, published in the 19th century. Avery's Historical Museum own a copy of the catalogue.

From scales surviving, we know that Newman's bought in scales, and that they repaired scales made by other makers. A butcher's scales with a brass lattice beam and Sharkey ends, made by

W & T Avery, with a brass pillar, iron lion feet, iron decorative harp top, and a brass balance ball to compensate for the weight of the porcelain plate, had a plate with a transfer print under the glaze stating "J. Newman, 156 Capel Street, Dublin, Repairers." See EQM pages 1519 and 1520.

A roberval shop scale with a white ceramic rectangular base, 20 inches (492 mm) long, with brass and white painted fittings was marked "J Newman Dublin." The author has not seen this scale, so cannot give details, but the ceramic base suggests that it might have been made when ideas on hygiene were becoming fashionable in the 1930s.

A postal steelyard, with its pillar brass stamped "S & P" (Simcox & Pemberton of Birmingham worked from 1818 until about 1842,) had the beam stamped "Newman, Dublin" and the letter plate "Newman, Capel Street, Dublin." See EQM page 1520. Obviously this postal was made right at the beginning of Newman's working life.

Four brass postal weights for 1 lb., 8 oz., 4 oz. and 2 oz. survive, stamped "J. Newman, Dublin". One trade weight, a flat brass 2 lbs., also survives, stamped "J Newman."

J. Newman's were taken over by W & T Avery Ltd. in 1914.

TP / JP

There must be doubt as to whether TP/JP was Irish. The guinea was valued at 22 shillings and 4 pence in Ireland, not at 21 shillings, as specified on the guinea weight. The half-guinea was valued at 11 shillings and 2 pence in Ireland, not at 10 shillings and 6 pence, as specified on the half-guinea weight.

The intertwined cursive initials **TP** on full weight guinea weights look very reminiscent of Henry Archdall's initials, being, like Archdall's, two initials intertwined with their mirror-image. The initials can equally well be read as **JP.** A candidate for JP is James Pickering, but he is known to have used a plain style **JP**. Of course, he could have had two designs.

Fig. 39. Probably English.

The guinea weight was shown as 5 pwt 9 grs, the weight at which guineas were minted, and over the weight at which they could pass at full value. Usually, guineas weighing 5 pwt 9 grs were separated out and sold back to the Mint in London as bullion, giving a profit to the seller of two pence.

William Parker working 178? - 179?

the Old Birmingham Ware-House, No. 4 Kennedy's Lane, Dublin

A bill-head (in the John Johnson collection of trade-cards) was printed by William Parker. *"the Old Birmingham Ware-House, No. 4 Kennedy's Lane, Dublin. WILLIAM PARKER (successor to the late Mr Richard Stone) has for sale, a variety of articles in the Hardware and Ironmongery Business vis. ... Rules, Scales [graduated rules] and compasses of all kinds ... Steelyards, Ouncels and Money-Scales ...Dublin, 178- Bought of William Parker".*

A later version stated *"... Steelyards, Ouncels, Balances and Money-Scales ... 179-".*

The use of the word "Ouncel" is amazing at this date. As Parker referred to steelyards separately, ouncel probably meant bismar. Bismars had been outlawed on the British Mainland in 1422, but had survived in the Hebrides and Orkney Islands until the 18th / 19th century. Did they also survive in Ireland? Have any survived into the 20th century?

This throws up interesting questions that can only be answered by investigation.

Pickering Which one?

A large set of nesting weights with six surviving cups, was stamped on each cup PICKERING and PILL LANE. Each cup was also stamped **IT** and **GH,** both marks of unknown significance, being either makers', adjusters' or area marks. The largest cup is for 64 Troy ounces, and was cast from a different, yellower batch of copper alloy, (brass,) from the inner, pinker batch of copper alloy, (bronze.) The stamps all match and the sizes fit together, so the set started life together, but maybe Pickering was not asked for a 64 oz. weight too frequently and had to make one separately. The 32 oz. weight was so badly underweight that it had a disc nearly ¼ inch, (2 mm) thick, of brass, soft–soldered onto the base.

Troy weights were used throughout the nineteenth century, so there is no way of dating these weights, or narrowing the maker to any one member of the Pickering family.

David Pickering working 1796 – 1806

1796–1806 73 Pill Lane, Dublin

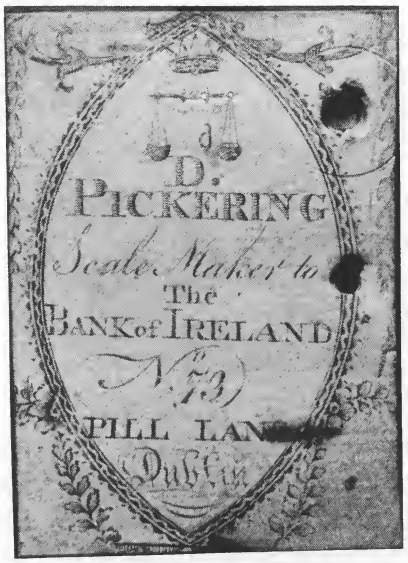


Fig. 41. David Pickering's trade card. Withers' photo.

David Pickering used the same premises as had James Pickering Senior, who was probably his grandfather and who worked as a watch maker from 1737 until his death in 1771. David Pickering was scale–maker to the Bank of Ireland from 1796 until 1798 only, but he was in trade directories until 1806. It would be interesting to know whether David Pickering was trained by Daniel Crosby Senior, down the road at number 36, Pill Lane.

Fig. 40.

Only two sets of coin / apothecary scales are recorded, one a very plain set in a beech–wood, made–up–box, 9 inches (225 mm) long. The beam looks like an ordinary, swan–neck end, London made beam, 7 inches (180 mm) long, with brass pans stamped in the centre **D.P** in a rectangle with zig–zag edges. See Fig. 40. The small label is a classical Regency style *"D^d PICKERING, Scale Maker to the BANK OF IRELAND, No 73, PILL LANE, Dublin".* It contains two little bronze weights of the type used for trade. One weighs a bit less than an Avoirdupois ½ oz, and was stamped **SS**, an unknown mark. The other was a light ¼ oz. weight, stamped **DC**, the mark of Daniel Crosby. Because Daniel Crosby Junior was working from 1785 until 1804, presumably the weight was stamped by him.

A second set is recorded at the Science Museum in London, but no details are available. The label is shown in Withers' book, showing holes where the knobbed guinea and half–guinea weights have pierced the label. Fig. 41. No knobbed weights made in Ireland have been recorded.

Fig. 42. D:P. Withers' photo.

Two guinea weights are shown by Withers, one shown in Fig. 42. The other one had the obverse the same as James Crosby's, but with a plain, slightly convex reverse, with **D.P** in a rectangle. See Withers no 2819 and 2761, (not 2861, as stated.)

James Pickering (Junior) working 1810 – 1834

1810–1834 73 Pill Lane, Dublin

1817 30, Upper Sackville Street, Dublin

James Pickering succeeded William Pickering as a scalemaker at 73, Pill Lane, Dublin in 1810, and was there until 1834. He was also recorded at 30, Upper Sackville Street, Dublin in 1817, which was probably his residence.

Fig. 43. The rarer type of box in Ireland, being made –up from oak wainscoting. So few examples survive that it is silly to generalise, but it does seem that the Irish makers made the box far bigger than the pans would require, in order to house the very long pointer. Note the tiny circular Irish sight–hole. Whipple Museum, Cambridge.

One coin/ apothecary scale has survived, at the Whipple Museum. See Fig. 43. The beam is exceptionally long and slender, being 10 inches (250 mm.) long, with the same unusual proportions of the pointer and shears as on the Henry Jackson coin scales. The pointer is nearly as long as half the beam, which is an Irish characteristic. The shears have a small sight hole, (like one of Daniel Crosby's,) another Irish characteristic. Again, the box (a beech–wood made–up–box) is exceptionally large, far bigger than is needed for a scale with pans of only 2 inches (50 mm.) in diameter, (like the David Pickering scale,) and yet another Irish characteristic. The trade–card is shown in Fig. 44. No weights have survived in this box.

The trade–card shows 73, Pill Lane, a double–fronted shop on the ground floor, with three upper floors. See Fig. 44. The shop sign is on an oval plaque screwed to the wall, and shows a crown and scales, the same sign as Daniel Crosby used at 36 Pill Lane. It states *"The Old Established Beam and Scale Manufactury, All sorts of Beams, Scales, Weights and Measures, Manufactured*

in the best manner & sold by Ja^{S} Pickering, Beam and Scalemaker to the Bank of Ireland, No 73, Pill Lane, Dublin. NB All sorts of Beams and Scales, Neatly Cleaned and Repaired"

James Pickering was the first Irish scale maker to refer to the manufacture of measures, although Daniel Crosby was importing them in 1753.

Another coin/ apothecary scale by James Pickering survives at the National Museum of Dublin. The box is another large box, 10½ inches (255 mm) long (of mahogany), but it contains two beams, confusingly. The box-end beam which fits more accurately is 9 inches (220 mm) long, but no details of the proportions of the pointer are available. The weights are interesting. There are 4 circular brass weights for 1 dram, 1 and 2 scruples and ½ scruple, all marked "Apothecaries Weights". There are two circular brass weights, with "**J*P**" and "5 PWT * 8 GRS" for a guinea minted after 1774, and "**J*P**" and "2 PWT * $13\frac{1}{8}$ GRS" for the old half-guinea. One circular brass weight is dated 1835. Also there are 9 rectangular weights, 8 of unspecified units and one for "PWT 5", five pennyweights. (See Mollan.)

A box of miscellaneous weights, being sold with a coin scale by Hudson, included two weights by "**J*P**", for 2.13 3/8 and for 1.18 alongside two weights by "**S*G**", for 2.13 1/8 and 5.8. The trade links between James Pickering and Samuel Gatchell seem close.

A guinea weight (photographed by Withers,) stamped **J*P** , was struck in the same die as the one stamped **S*G**, the stamp of Samuel Gatchell. Also two of James Pickering's sovereign weight dies were used to strike Samuel Gatchell's weights. James Pickering claimed to make weights, whereas Samuel Gatchell did not claim to make weights, so, for want of better evidence, we must assume that James Pickering was the maker.

Fig. 44. Trade card from the box shown in Fig. 43.

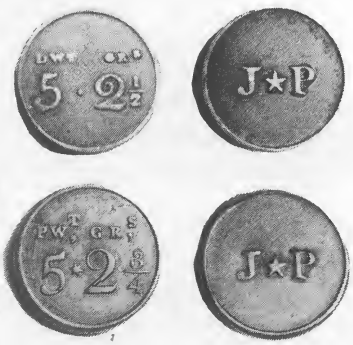


Fig. 45. Sovereign weights stamped JP. Withers' photos.

It surprises me that James Pickering had three dies for sovereign weights. He needed two, because the weight at which the sovereign passed was altered by a ¼ grain, but why did he cut two almost identical dies for the lighter sovereign? Surely one did not wear out within the 17 years he was working on sovereign weights? Could this mean that he, too, was buying in from another maker who made in such quantities that his dies wore out? Could Pickering have bought from two different sources?

The last part of this article should appear in the next issue of EQM.

ISASC

EQUILIBRIUM®

QUARTERLY MAGAZINE OF THE INTERNATIONAL SOCIETY OF ANTIQUE SCALE COLLECTORS

1994—ISSUE NO. 4 PAGES 1833-1860

PAGE 1834

Cover Picture

This steelyard is in the collection of the Pitt–Rivers Museum in Oxford. The label states "Small steelyard used to weigh foreign coin. Ireland. XVIIth century. PR coll 226–12099." If this steelyard was indicating pennies–worth of silver coins, which coins could it be used for? The English government made numerous proclamations to say how much the coins were to pass for in Ireland in the 17th century, but the values on the steelyard do not match any of the proclamations. So, we have two alternatives. Either the values are not those of **official** Ireland, or the values do not relate to Ireland at all.

First consider an unofficial rate in Ireland:
6 is straight–forward = 1 English sixpence.
12 is straight–forward = 1 English shilling = 12 pennies.
28 = 2/4. Could it be half an old Peru Piece of eight? Officially it was worth 2/4½ d.
35 = 2/11. Could it be a half Ducatoon? Officially it was worth a penny more, at 3/–.
56 = 4/8. Could it be one old Peru Piece of eight? Officially it was worth 4/9.
70 = 5/10. Could it be a Ducatoon? Officially it was worth two pennies more, 6/–.

Secondly, consider the value of silver coins in the Netherlands, expressed in stivers, in the 17th century:
6 = one eighth of a Spanish real of eight.
12 = one quarter of a Spanish real of eight.
28 = Frisian florin.
35 = not identified.
56 = was there a two florin piece?
70 = (double 35) not identified.

Can any ISASC member solve this problem?

Wise Words of John Quincy Adams, 1821

Weights and measures may be ranked among the necessaries of life to every individual of human society. They enter into the economical arrangements and daily concerns of every family. They are necessary to every occupation of human industry; to the distribution and security of every species of property; to every transaction of trade and commerce; to the labours of the husbandman; to the ingenuity of the artificer; to the studies of the philosopher; to the researches of the antiquarian, to the navigation of the mariner and the marches of the soldier; to all the exchanges of peace, and all the occupations of war. The knowledge of them, as in established use, is among the first elements of education, and is often learned by those who learn nothing else, not even to read and write. This knowledge is riveted in the memory by the habitual application of it to the employments of men throughout life.

INTERNATIONAL SOCIETY OF ANTIQUE SCALE COLLECTORS

Founded September, 1976

176 West Adams St. • Suite 1706 • Chicago, IL 60603 • Phone 312/263-7500

For membership information, write to address above.

EQUILIBRIUM is published quarterly in January, April, July and October.

Editor—Diana Crawforth-Hitchins

15 Hawthorn Ave, Headington
Oxford OX3 9JQ, England

ISSN-0893-2883

Comment of English W & M Inspectors

By R P HOLDAWAY

The Weights and Measures Act of 1878 empowered local authorities to make bye–laws as to the verification and stamping of weights and measures used for trade purposes. The object of this provision (which was intended to attain a degree of uniformity by inspectors in testing such weights and measures,) basically failed because there was no obligation upon a local authority to make such bye–laws. Note that weighing instruments were not required to be verified and stamped until 1890.

This condition was partially remedied by legislation dated 1889, which required local authorities to make regulations with respect to the manner in which weights, measures, weighing and measuring instruments were verified and stamped, including the prohibition of stamping where the material or mode of construction appeared likely to facilitate the perpetration of fraud. To assist and encourage local authorities in this task, the Board of Trade in 1890 issued model regulations which gave guidance but were not mandatory.

It is not surprising, therefore, that the desirable uniformity of practice that many inspectors (and presumably all manufacturers of weighing and measuring equipment) were seeking was still a distant dream. Indeed it was not until a further 17 years had passed that the Weights and Measures Regulations of 1907 (generally referred to as the Board of Trade Regulations) came into force, the observance of which was compulsory upon local authorities and their inspectors throughout the United Kingdom.

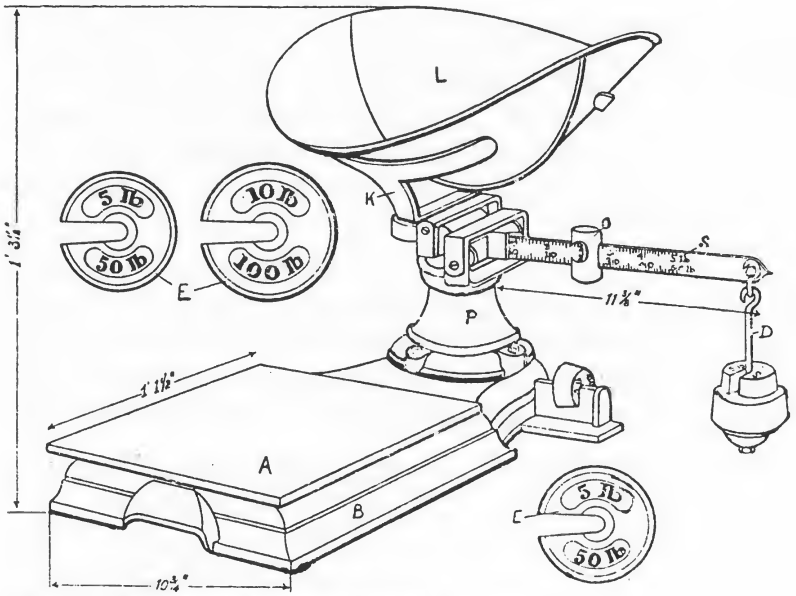


Fig. 1. Who was the Manufacturer? Pooley?

A Union scale like this could have been used for trade purposes in the UK before 1890 without any local authorities' disapproval. According to the Board of Trade Notices Annoted, published in 1913, an instrument similar to this Union type was illustrated in the model regulations under the style and title *"Counter Steelyard for Manufacturers' Use." Patterns of this instrument were rarely, if ever, stamped in the days of the days of the model regulations; but even though they had been, the description "for manufacturers use" would not now apply. The uses to which most manufacturers' weighing appliances are subjected come within the definition of the term "trade", and this machine is now condemned for trade purposes."*

Bibliography

Cunliffe & Owen Board of Trade Notices Annoted, Vol. 1, published by Cunliffe, 1913.

Editor: When the Board refused a certificate, they did not publish the name of the manufacturer who presented the scale. A likely candidate was Henry Pooley, who was Fairbanks' agent in England, and manufactured Fairbanks' Platform scales for the British market. (See EQM pages 724–727.) No Union scales were in Pooley's catalogue of c. 1877. As Michael Crawforth commented, Pooley altered Fairbanks' designs, and this drawing shows every sign of having been

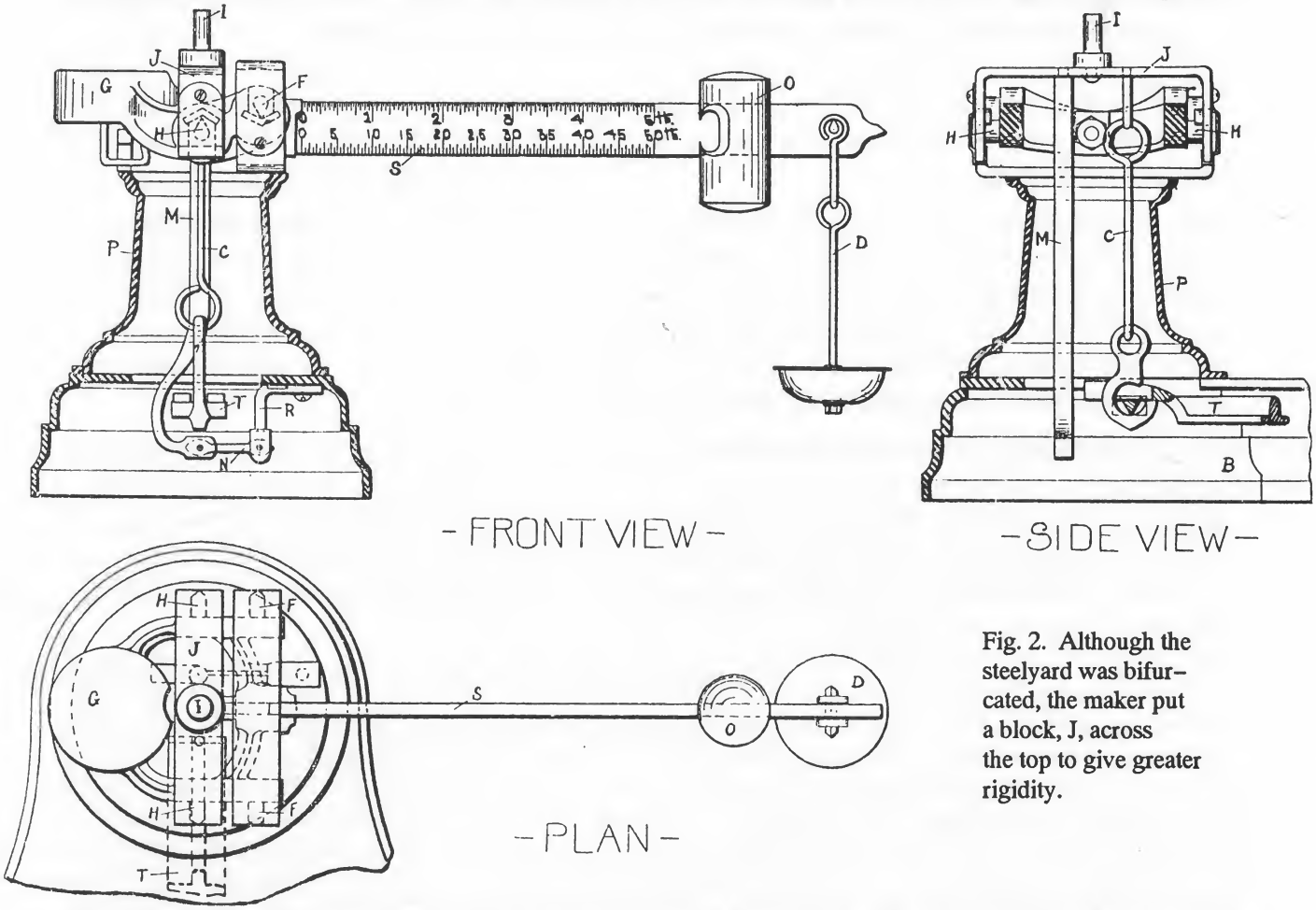


Fig. 2. Although the steelyard was bifurcated, the maker put a block, J, across the top to give greater rigidity.

altered by an Englishman. The pillar is attached to the base in the UK way, with the base casting going right under and beyond the pillar. The poises have the numbers cast into them in a shaped hollow, so that the upper poises did not rub away the numbers on the lower poises. There was a projecting hump on the base, where the slotted poises were to be stored, the UK means of storage.

The other drawings published in the Board of Trade Notices Annotated, (see Fig. 2,) were very clear. The rod M was *not* attached directly to the platform Y frame, but was attached to a little link N, which was linked to a little bent arm R that was fixed to the casing. This kept the scoop moving up and down vertically. The platform lever Y–frame T was attached to the steelyard by the steelyard rod, C. The shapes were not the same as those in the exploded drawing, and the rods were attached at their tops to a brace that went over the top of the bifurcated steelyard, but possibly the American Union Scale had the same engineering inside it.

In the Fairbanks version, the end of the Y frame had the knife shown at its end, vertically. In the drawing of the UK version, in Fig. 2, the knife was shown at the bottom of the steelyard rod, vertically, so that wear was minimised on the less significant rod, and the risk of wear, leading to the ratio changing on that all–important long lever, was increased.

By J CHEESEMAN

I studied the exploded diagram, Fig. 5, page 1808, and found it difficult to comprehend how the cross head post 5 (bearing / connecting rod,) the steelyard rod 9 (leg stay,) and the wire lever 23 (stay) connect together. The English version appears only to be offered with the scoop attachment. This fitment ensured that the applied load would tend to settle centrally within the scoop, with the resultant axial loading to the pivot point (load knife edge,) the ideal situation. If a flat plate attachment had been fitted by Fairbanks and the scale tested for trade use, I contend that the lateral forces induced by an eccentric load test upon the crude wire stay mechanism may have indicated false weight indications, perhaps one of the reasons for the Board of Trade's reluctance to issue a notice of approval.

The bifurcated steelyard (which tended to be fitted to heavy capacity machines) although used quite extensively, required that each pair of knife edges had not only to be correctly gauged, but also accurately aligned, as otherwise, errors would occur. A single continuous knife edge would have been easier and cheaper to fit.

The comments on page 69 of the Board of Trade Notices Annoted (Fig. 3,) discuss the interlinked nature of the scoop and the platform, but does not spell out how easy it would be for a fraud to be committed by placing a small weight or object on the platform in a concealed position, and then using the scoop to weigh the customer's goods. The customer might ask for 5 lbs of goods, and the trader would put the poise at 5 lbs, and pour in the goods. Because the small object under the platform would already be pulling down the scoop by, say, 1 lbs, the trader would only need to place 4 lbs of goods for the steelyard to balance. A nice little earner!

All the several parts of this "combination" weighing machine are included in establishing equilibrium when the machine is unloaded, and remains so whichever part of the combination may be in use. It is not possible to relieve or detach the one while the other is in use. To remove the scoop while the platform is in use would put the machine seriously out of balance. At the same time it is not possible to use both scoop and platform in one and the same operation when determining the weight of a commodity. For instance, if two unknown loads were placed on the machine, the one in the scoop and the other on the platform, the true weight of their combined loads would not be indicated, simply because both counterpoise and steelyard register that weight in accordance with two different scales, neither of which under those circumstances would be correct.

Fig. 3. Cunliffe & Owen had two more worries about the combination.

Counterpoises for platform machines were not weights within the meaning of the Act. They could not be taken to another scale and used at the unit which Fairbanks put on them, ¾ lbs and 1½ lbs. Perhaps that was why no mention was made of their real weight on the British version.

In Britain counterpoises had to have an identifying mark, usually placed on the side, and the same mark on the scale to which they belonged, so that the set of counterpoises that had been tested with a particular scale were always used with that scale only. So each scale had its own identifying mark.

We are thinking of these scales in relation to their potential use as trade scales, but we must remember that probably over half of all scales were used for non-trade purposes. Every factory, workshop, railway depot and canteen had scales for internal use. They could use any design that suited them, and no Inspector had any right to comment on their effectiveness. These Union scales might have suited some users very well. We just have to hope that the one user did not

have two variations of the Union scale, one with a double beam and one with a single beam, as they would have needed an even clearer head!

In parenthesis, the exploded drawing on page 1808 shows a little fastening, number 3, the platform pin. This was an essential component, keeping the platform attached (loosely) to the base. If it was not done up, the platform could be tipped up so violently that the platform would flip off the base and injure the person using the machine. That happened if the user tried to push a load up onto the platform, and had the whole weight of the load outside the pivot points that pushed down on the Y and U frames. Each manufacturer of platform machines had his own catch or catches, usually one hooked under the base when the platform was put on the base, and one fastened on afterwards.

Bibliography

Weights & Measures Regulations, 1907.

By J KNIGHTS

This Fairbanks Union Scale is not really as complicated or enigmatic as might be imagined. It is basically a bench platform machine with a compound lever system of the Fairbanks type with an additional intermediate load receptor, in the form of a scoop, mounted directly on the load knife edge of the steelyard and thereby by–passing the eight to one ratio of the bottom work.

When the scoop was used, instead of the platform, the machine is effectively converted into a lever counter machine with a loose weight ratio of five to one. This appears to give an overall ratio of 40–1 with the platform ratio eight times bigger. The UK one has a 50–1 ratio with the platform 10x the steelyard.

The scoop form of receptor would be used instead of a flat plate to minimise the effects of eccentric loading.

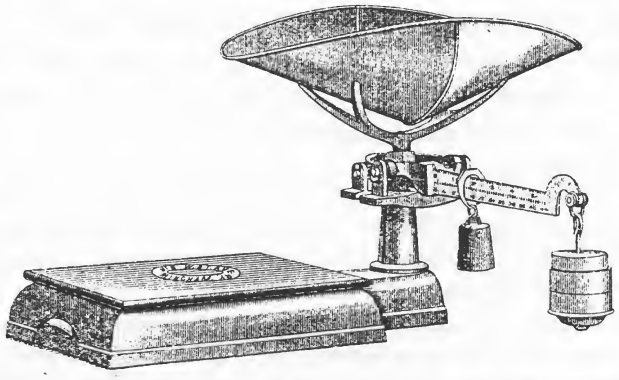


Fig. 4. W & T Avery's Lever Counter Machine, 1880. To weigh ½ oz to 248 lbs. Platform 13½ x 10½", 70/–.

Fig. 5. From the Model Regulations, 1890.

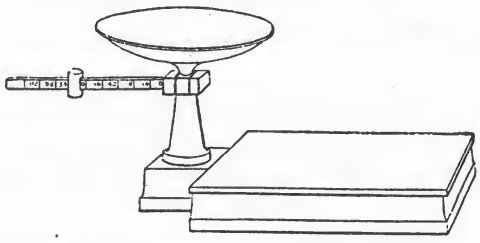


Fig. 67B. Counter steelyard, for manufacturers' use.

This, along with the dual capacity and the general antipathy towards counter steelyards meant that the machine was never approved in the U K under the regime of the 1904 Act. It was submitted in 1905. It had been marketed by Avery's (1880 catalogue, see Fig. 4,) and mentioned in the 1890 Model Regulations made under the 1889 Act as a piece of equipment for *"manufacturers' use."* See Fig. 5.

The acceptance of this sort of machine in USA and its rejection in UK serves to high–light the rather different approach to legal metrology that seemed to exist in those days.

Bibliography

Weights and Measures. Inspectors and Inspection. Model Regulations. 1890.
W & T Avery catalogue, 1880.

The illustration sent by John Knights taken from the Avery 1880 catalogue, (Fig. 4,) alerted me to the use of these Union Scales in Britain. I went back to my early catalogues, and found more Avery versions, but none from any other English manufacturer. Who made Union scales first, Avery's or Fairbanks? Did one maker copy the other? Did the idea of the combination arise independently? As both Avery and Fairbanks were companies that believed strongly in getting legal protection, I searched the Abridged British Patent Specifications, 1840–1899, that we collected, but found nothing relevant. Either they could not get protection, if somebody else had beaten them to it, or Michael and I did not collect the relevant patents.

The 1880 comment under the Lever Counter Machine, no. 119, is interesting. *"This machine, which is a combination of the Platform and the Contracting Counter Machine, is very useful for general Stores, the Top Scoop being used for loose goods, and the Platform for made–up parcels.* ***By a simple contrivance the Platform and the Scale are attached to one steelyard, without in the slightest degree affecting the weighing qualities of either."*** After reading the comments of Cunliffe and Owen in 1913 , (Fig. 3,) it seems difficult to justify that remark.

The Lever Counter Machine was still in the Avery catalogue of 1885, (Fig. 6,) but it had new features. The base had a projection on which the slotted poises could be stored. The spider supporting the scoop had been altered from four 'fingers' to two bars held out on widely spaced supports. The beam end was altered from a swan–neck to an 'arrow–tip' (as Fairbanks called it when they introduced it, some time after 1906,) and the hanging poise was altered to a sliding rider poise. A nickel–plated beam was offered. The capacity had been increased by 2 lbs, and the price had gone down by a third!!

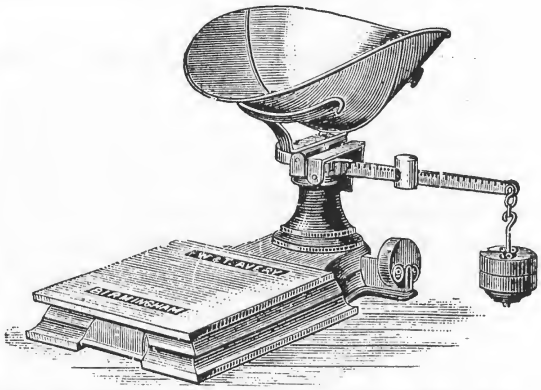


Fig. 6. W & T Avery. In both 1885 and 1898 catalogues, but with different words beneath.

By 1898, Avery called it the Union Machine, (Fig. 6,) and offered it in two qualities. *"Regular Quality, neatly Japanned and Gilt, with well–steeled working parts, Nickel–plated Steelyard and Slide, and polished scoop. Second Quality, neatly Japanned and with chilled iron bearings."* Avery put a note at the bottom that makes the use of the Union sound incredibly easy to do wrongly; *"If made to weigh in two Standards, including two sets of Weights, 5/– extra."* If both sets of weights worked, then the beam needed four sets of graduations, two for the scoop and two for the platform! They then admitted *"These machines are suitable only for Domestic use or Export."* The implication was that the Model Regulations had closed Avery's market to shop–keepers in UK.

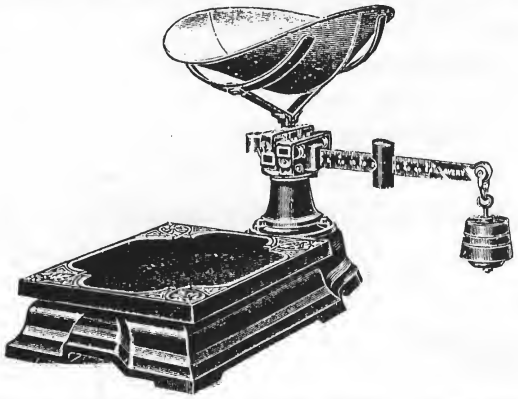


Fig. 7. W & T Avery Ltd, 1906. Cost 45/–. Where were the slotted poises kept?

By 1906 W & T Avery Ltd were selling it as *"Avery's Improved Pattern Union Counter Scales. **Most Useful for Stores, Domestic Purposes, and wherever Scales are required for a variety of uses.** Not for trade Use in England. Avery's Union Counter Scales improved Pattern. Designed to meet the requirements of the Introduction of the Weights and Measures Acts into the Colonies. Price 45/–.....Can be arranged to weigh in any Standard or in Two Standards, eg, English and Spanish, without extra charge."* (Fig. 7.) The idea that scales that were too liable to the perpetration of fraud in England were perfectly suitable for the Colonies, was an idea that came frequently into scale catalogues of that period. It was immoral but considered normal then.

(J. Garland & Co.'s Quality.)

Also in the 1906 catalogue, Avery's Best Union Counter Scales had virtually the same words, but cost 73/–. The cheaper quality *"J. Garland & Co, sizes and capacity as above, cost 27/–"*. All the Avery scales sold with the name J Garland & Co, a company that Avery bought in about 1885, were in reality cheap Avery scales. The catalogues give no clue as to the differences that would allow one design to vary in price so dramatically.

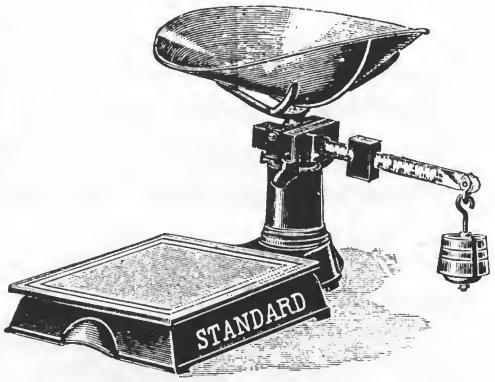
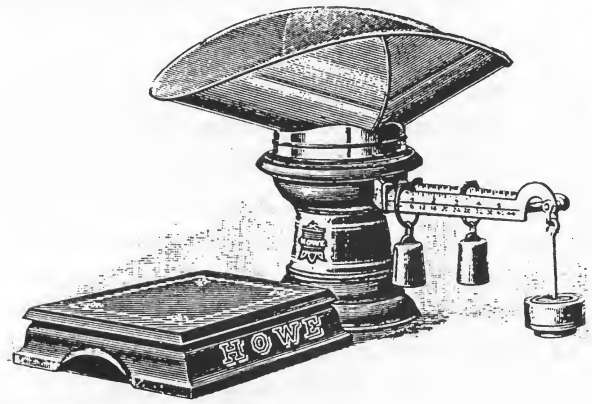


Fig. 8. W & T Avery Ltd, 1909. The shape of the sliding poise had changed to rectangular. Could be arranged to weigh in any Standard.

By 1909 Avery added "Steel Knives and Bearings." Obviously the customers also wanted to know why they should pay 73/– when they could get an apparently identical scale for 45/–. The J Garland version was at a "Reduced Price 21/–." (Fig. 8.) Were Avery's selling off old, unwanted stock? Were the Weights & Measures Inspectors toughening up, with the 1907 Regulations to back them up?

US Union Scales



Howe Scale Co, 1883.

Many companies in USA made Union Scales:–

E & T Fairbanks and Co, 1859, 1880, 1891, 1904, 1919 and 1927.
Fairbanks Morse & Co, 1927.
Jones of Binghampton, c. 1885
Buffalo Scale Co, 1894.
Buffalo Scale Co Inc, c. 1923.
Howe Scale Co, 1883 and 1902.
John Chatillon & Sons, 1894 and 1924.

Contemporary Comment

In 1992, a Scottish woman went to Cuba to study modern dance. She was taken to buy food in an official Government food store, and found that the only food available was beans. These beans were weighed out using a dilapidated Union scale with a single beam.

Irish Makers/ Retailers Pt 4 By D Crawforth–Hitchins

William Pickering working 1799 – 1809

1799–1804 73, Pill Lane, Dublin
1809 78, Pill Lane, Dublin

William Pickering worked in the same premises as David Pickering, but had a separate entry in trade directories. David was scale–maker to the Bank of Ireland until 1798, then William was scale–maker to the Bank of Ireland from 1799 until 1804. What was David's reaction? Why was the contract transferred?

William Pickering was in trade directories of 1809 as "Scalemaker at 78, Pill Lane", with no reference to his being scalemaker to the Bank of Ireland. Had he lost the contract? Had he really moved? So many errors occurred in the numbering in trade directories that it seems probable that a typesetter misread 73 as 78.

None of his work is known.

James Robinson working 1845 – 1884

1851 65, Grafton Street, Dublin

James Robinson called himself an "Optician and Philosophical Artist", but he should be classified as a medical, photographic and scientific instrument maker. He worked from 1845 until he brought his sons into the business in 1885. A one page advertisement is known, dated 1851, of his microscopes, bound into a book, R D Lyons' *An Apology for the Microscope.* He was then at "The Polytechnic Museum, 65, Grafton Street." He made electro–medical apparatus, microscopes, telescopes, medical cameras, and one scale has survived.

The apothecary/ photography scale had a 6 inch (150 mm) long beam, with brass pans and a 1 dram weight. The trade–card in the lid of the box stated *"James Robinson, 65, Grafton Street, Dublin, Optician and Philosophical Artist."* (See Mollan.)

James Robinson & Sons working 1885 – 1903

1885–1903 65, Grafton Street, Dublin

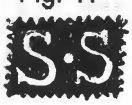
This firm continued the business of James Robinson, making similar products. One precision balance is recorded by Mollan. It had a 13 inch (320 mm) lattice beam, and was housed in a glass case with mahogany frame, two drawers, two doors at the front and two doors at the side. It had a central knob in front to raise the beam. It had two spirit levels and a conical [?] brass pillar, with a small graduated ivory plate at its base, without numbers, and silvered pans. Holbrook wondered whether this balance was made by Oertling.

SS ? working c. 1800?

c. 1800? Dublin?

S·S is stamped onto a little bronze weight in a box by David Pickering, who was working from 1796 until 1806. The weight does not conform to any standard unit, but is probably a light Avoirdupois ½ oz. The stamp may be the mark of an adjuster, a maker or an area.

Fig. 41



W. R. Simpson working 1898 – 1910

1898–1910 107 Donegal Street, Belfast

W R Simpson, scales and weights maker, at, 107 Donegal Street, in Trade Directory of 1898, and as a scalemaker in the Inspectors' Handbook of 1910.

An antique shop had a butcher's scale with a brass lattice beam, on a brass pillar, supported on a small iron base with four lion feet, and with an iron harp top. It had one brass pan with a balance ball, and one pot plate, transfer–printed *"Simpson, Belfast, Weighing Machine Maker."* The beam was marked *"Class B. To weigh 7 lbs."* so it was made after 1907, when the classifications A, B and C came into use. Because it was only the pot plate that was named, we cannot be sure whether the scale was made by Simpson or merely repaired by Simpson.

J. L. Smallman working 1910.

1910 William's Row, Bachelor's Walk, Dublin.

J L Smallman, scalemaker at William's Row, Bachelor's Walk in the Inspectors' Handbook of 1910.

No work known.

Richard Smart working 1674 – 1691

1674–1691 Cork

Richard Smart was a goldsmith in Cork. Cork was a thriving provincial city, with a Goldsmith's Company in the 17th century, of which he was Warden in 1674 (so he was working well before 1674) and Master in 1676 and 1691. He was appointed Maker of Money Weights for Ireland in 1679, according to Westropp.

Fig. 42. Weight for 8 Reales. Withers' photo.

A weight was seen by Westropp, bearing the Cork City arms, the number of pennyweights and grains, and *"Richard Smart, Cork, goldsmith".*

Withers photographed an 8 reale weight countermarked by Richard Smart. Perhaps Smart should not have stamped it, as it was 11½ grains underweight. Obviously, some wear must be expected, but that was a **lot** of wear! Whenever that weight was used, somebody lost 1½ pennies. See Withers no. 2550a.

Fig. 43.

Another 8 reale weight, (Fig. 42,) with ***RICHARD SMART OF CORK*** on the reverse, had C C, [for City of Cork] above a sailing ship between two towers, [the arms of the city.] The two reale weight was 21 grains underweight, an amazing loss, and such a lot that there must be some suspicion that it was deliberate. Most other weights of that period had lost about three grains, an amount that perhaps could be attributed to wear.

As a silversmith, he registered his mark. (See Fig. 43.) He also used this mark on reale weights.

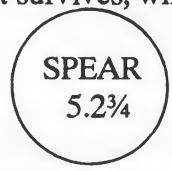
Richard Spear, (Speer or Spere) working 1791–1835

1791–1792 29 Chapel Street, Dublin,
1793–1809 23 Chapel Street, Dublin
1812–1835 27 College Green, Dublin

Richard Spear was a mathematical instrument maker, spermaceti [a waxy solid obtained from the oil of cetaceans and especially sperm whales and used in ointments, cosmetics and candles,] refiner and oil merchant between 1791 and 1835. He continued until 1842 as R. Spear and Co. There was a short period, between 1815 and 1817, when he was in partnership with Edward Clark, an optician, (meaning a maker of optical instruments, not a tester of eyes) at 27 College Green. Obviously most of his instruments are outside the scope of EQM, (as he made instruments such as the saccharometer and the hydrometer designed by William Speer of Dublin,) but he did make one instrument of interest to ISASC members.

His chondrometer seems to be of standard design, with a swan–neck end. The trade–card has a manuscript addition *"Made &"* put in front of *"Sold by R. Spear, 27, College Green, Dublin"*. The instrument is in the National Museum of Dublin. See Mollan.

A uniface sovereign weight survives, which might have been made by Richard Spear. It was seen by Jaap Visser.



J Spencer & Son working 1866 – 1883

1866–1883 19, Grafton Street, Dublin

J. Spencer & Son took over from John Spencer in about 1866 as scientific instrument makers / suppliers. They stated that they were Opticians to the Queen.

They supplied a precision balance, marked *"Ladd & Oertling, London. Sold by J. Spencer & Son, 19, Grafton Street, Dublin"*. It had a lattice beam 12 inches (360 mm) long, with platinised copper pans. The glass case had two drawers. It had agate plates. It had two brass weights with screw–off lids, containing lead shot. (See Mollan.)

Another balance, without a glass case, was marked "*J Spencer & Son, Optician to the Queen, 19, Grafton Street, Dublin. Ladd & Oertling, London."* and, on the trade label in the drawer, "*Ladd & Oertling, 27, Moorgate Street, E C London. Supplied by Spencer & Son.*"

Ladd and Oertling were recorded in trade directories between 1861 and 1865, so these balances was probably made in about 1866.

John Spencer working 1838 – 1863

1838 128 Summerhill, Dublin
1845 – 1850 3 Aungier Street, Dublin
1852 – 1863 13 Aungier Street, Dublin

John Spencer was an optical, mathematical and philosophical instrument maker from 1838 until 1863. By 1866 he was in business with his son.

St Patrick's College in Maynooth has a box of grain weights with a trade card stating *"J. Spencer, Optician, 13, Aungier Street, Dublin"*. He was at that address from 1852 until 1863. The

mahogany box contains 9 rectangular brass weights for 2 to 1,000 grains, and space for smaller weights. See Mollan.

I T working c. 1820??

c 1820?? Dublin?

A nicely designed stamp, (see Fig. 44) is on every cup of a set of nesting weights marked PICKERING and PILL LANE. The cups also bear another stamp, of **GH.** The stamp **I T** may be the stamp of a maker, an inspector or a district. I T may not have been a contemporary of any of the Pickerings.

Fig. 44

R T working 17th century??

Ireland??

The steelyard stamped R T has so many peculiarities that it has been separated out into an article on page 1847. It might be Irish, as it was found in Ireland.

James Warren working 1752–died 1789

1752–1768 at the sign of St Dunstan, Skinner Row, Dublin
1768–82 at the sign of St Dunstan, 10 Cork Hill, Dublin
1781–82 20 Cork Hill, Dublin

James Warren was a goldsmith, bound 1742 to Andrew Goodwin, and freed in 1752. He became Master of Goldsmith's Company in 1777. He used two marks, **IW** in a rectangle and **JW** in a rectangle on his silver. (See *Collecting Irish Silver, 1637–1900,* by D Bennett.) He was Maker of Weights for Ireland from 1760 to 1782, after Henry Archdall, but he was not Assay Master like his predecessors. He put out an advertisement in 1760, according to Westropp, *"..... to prevent any person or persons counterfeiting the same, I have put* **I*W** [shield between] *on one side thereof, affixed the date of the present year 1760 thereon, and marked my grains in like manner."* See Fig. 45. No grain weights marked **I*W** are recorded in the literature.

Two set of scales are in the Science Museum, London, with James Warren's label, but no details are available. Both scales are reported to be in oak, made–up–boxes. The labels are illustrated in Withers, page 316. One gave the value of the Pistole and the "Moydore," and the other label gave the value of the "French Guinea," [Louis d'or,] and the "new Portugal Piece." As they both bear the first address, they must both pre–date Warren's move in 1768. The values can be compared by referring to Benjamin Martin's Table of Gold Coin, printed in 1773, which was shown on EQM, page 310.

Weights have survived in the Science Museum, a set of circular brass weights with the Irish harp, dated 1760, and marked **IW**. A similar part set was reported by Sheppard and Musham.

Coin	Ireland 1767	England 1773
Pistole	£– 18 3	£ – 16 9¾
Moidore	£1 9 3	£1 7 0
Louis d'or	£1 2 0	£1 0 6
Port Piece	£3 17 8	£3 12 0
Guinea	£1 2 4	£1 1 1

Fig. 45. Weight for 4 escudos, or Portuguese Piece. Withers' photo.

The Withers saw fourteen weights by Warren with a tiny harp (which left room for good, bold numerals showing the weight distinctly,) on the obverse, and with a tiny I to the left of the Coat of Arms, and a tiny W to the right, on the reverse of each. The weights were for the foreign coins listed in the table above, but not for the guinea. They weighed very accurately, except for one half–moidore, which was 4½ grains over–weight, a surprising error! They were not accurately struck, with the image off–centre on nine weights.

James Warren also made weights for the light guinea of 5.3 and the ½ Guinea, weights that could legally be made by anybody, as the guinea and half–guinea were not specifically mentioned in the Proclamation, and were thus not restricted to being made by the Official Maker of Weights only. Warren used a charming JWJ twined monogram. See Fig. 46.

Fig. 46. Warren's guinea weight obverse & reverse, & half guinea obverse & reverse. Withers' photos.

Malter sold a moidore weight in 1986, which was 3½ grains light.

James Warren put an advertisement in the Dublin Mercury on 29th September 1768, *"MONEY WEIGHTS: James Warren goldsmith and jeweller, and maker of money weights for weighing all gold coin current in this Kingdom, by authority of the Government, takes the liberty to acquaint his friends and the public, that he has removed from Skinner–row to the sign of St. Dunstan on Cork–Hill, where the public may be supplied with money weights and all sorts of the best money scales, and where he intends carrying on the goldsmith's and jeweller's business in all their branches,.....he also sells goldsmiths' and apothecaries weights and mends and adjusts old scales as usual."*

Who made the scales that were in the boxes into which Warren put his labels? Was it one of the Irish makers?

Yeates & Sons working 1832–1898

1832–1887	2, Grafton Street, Dublin
1839	9, Nassau Street, Dublin

Two firms called Yeates & Son worked in Dublin. Samuel Yeates & Son worked at 2, Grafton Street from 1832 to 1839, and at 9, Nassau Street in 1839. George Yeates & Son worked at 2, Grafton Street from 1840 until 1887. They were both advertising as Opticians in trade Directories of the period.

Opticians made instruments other than those containing lenses sometimes, and they also retailed instruments by other makers. Yeates & Son were **the** suppliers of instruments to the Irish in the second half of the 19th century. Any instrument needed for experimental or laboratory work during that fruitful period for science could be obtained from Yeates & Son. Four catalogues survive, dated 1877, 1880, 1883 and 1887. They were illustrated, small catalogues, the first of electrical apparatus, the second of optical instruments, the third of apparatus for experiments in heat and the fourth of drawing, surveying and general engineering instruments. All are at the Science Museum in London.

An electro–magnetic balance has survived, that was used to measure the strength of the current applied to the coil. It was marked *"Yeates & Son Dublin."* The beam was 18" (430 mm) long, with a brass pillar on a red iron base, an electromagnetic coil and a central magnet attached to the

beam on a pivot. These electro–magnetic balances were used at the end of the 19th century, so presumably George Yeates & Son made it.

An electric balance marked "Yeates & Son, Dublin" is described by Mollan, (UDE 156.) Being difficult to envisage, I quote Mollan's description, "*Mahogany base 306 x 152 mm, 4 brass level screws, glazed mahogany housing for pivot, constraint, and disc; incomplete. The pivot is on an ebonite pillar, but is attached by a wire to a brass screw contact outside the housing; the constraint is an ivory U on an ebonite pillar; the brass disc D65 is also on an ebonite pillar, this time in a brass sleeve on the base; the balance arm and upper disc are missing; there is an un–numbered ivory scale attached to the housing above the disc; only one (of two) sliding glass panels on the housing remains.*"

Bibliography

Anderson, Burnett & Gee	Handbook of Scientific Instrument–Makers' Trade Catalogues 1600–1914, Edinburgh, 1990.
	Present State of Great Britain, printed for J Brotherton et al, 1738.
Clifton & Crawforth	Project Simon, kept at National Maritime Museum, Greenwich.
Crawforth M A	Weighing Coins, English folding gold balances of the 18th & 19th century, Cape Horn Trading Co Ltd, 12, New Row, Covent Garden, London, WC2N 4LF, 1979.
Grueber, H A	Handbook of the Coins of G B & Ireland in the British Museum, Quaritch et al, 1899
Holbrook, M	Science Preserved, HMSO, 1992.
Jenkinson, C	Treatise on the Coins of the Realm 1805, Kelly reprint, 1968.
Josset, C R	Money in Britain, Warne, 1962.
Kenyon, R L	Gold Coins of England, Kelly reprint, 1970.
Lawrence, L A	Coin Weights, British Numismatic Journal, 1910.
Linecar, H W A	Coins, Benn, 1967.
Mallis, G	Coin Weights for Foreign Coins that were Current in Ireland. Numismatist, Jan, 1978.
Mollan, C	Irish National Inventory of Historic Scientific Instruments, Eolas, 1990.
Ruding, Rev R	Annals of the Coinage of Great Britain, 1840.
Shaw, W A	History of Currency, 1895.
Sheppard & Musham	Money Scales & Weights, Spink, republished 1975.
Westropp M S	Notes on Irish Money Weights, Proceedings of Royal Irish Academy, Dublin, 1916
Withers, P & B R	British Coin Weights, Llanfyllin, 1994.

Books that should be investigated

Bolton R	A Justice of the Peace for Ireland, consisting of Two Bookes, Dublin, 1638
	British Museum Documents, Royal 18 CXIV, Irish Accompts, 1495–1496, Folio 154–157. Composition of Weights & Measures.
	Calendar of the Justiciary Rolls, Proceedings in the Court of the Justiciar of Ireland, ed, J Mills, 2 volumes, London, 1914.
	Historic & Municipal Documents of Ireland, AD 1172–1320, ed. J T Gilbert, Rerum Britannicarum Medii Aevi Scriptores, London, 1870.
Simon,	Essay on Irish Coins;– the book I should have used, but was unable to obtain in time!

With thanks to Sjeord Bruinsma, John Burnett, Serge Camilleri, Robert Heslip, Jerry Katz, Roy Ladell, Gene Mahoney, Joel Malter, Charles Mollan, Alison Morrison–Lowe, Numismatica Wein, Fritz Schmerl, Don Schoenly, Sotheby's Auction House, Brian Stimpson, Norman Sturgess, Jaap Visser, Lewis Weiss, and the Whipple Museum, Cambridge.

My gratitude to Bende and Paul Withers cannot be emphasised too much, as I learned an incredible amount from their meticulous work which I have incorporated into the list of Irish makers. I have used their photographs with some trepidation, because our use of cream paper and brown ink gives very poor definition. In the Withers' book, the photographs are bright, crisp and full of details which you will not be able to see in EQM.

Additions to Irish Makers/ Retailers

FLETCHER working c.1780
c. 1774–1797 Ireland?

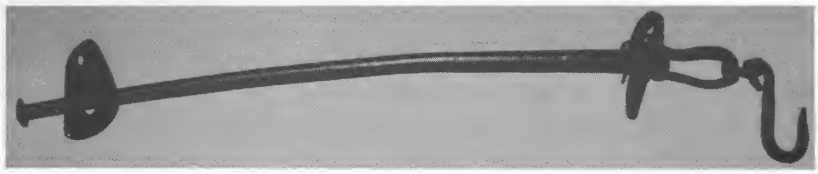
Nothing is known of this maker, drawn to our attention by Serge Camilleri. A folding guinea balance of conventional single–turn steelyard design had a table of guineas, giving the value of one guinea as £1..2..9, two guineas as £2..5..6, continuing up to 100 guineas as £113..15..0. At the bottom of the label, it stated *"Made and sold BY FLETCHER....."* The bottom of the label was cut off, so any address is missing.

It is exciting to add a new name to Crawforth's list, and even more exciting to find a new feature on a folder. The folder had a coin gauge fitted between the pillars which support the rest of the turn. Gauges were added to several folders, but this is the first one seen in this position.

R T possibly 17th century
found in Ireland

A brass steelyard at Strokestown Park House is included very hesitantly, because (a) it may be English not Irish, and (b) the initials are different sizes and may not be those of a maker. However, it is an unusual steelyard and should be in the scales' literature somewhere.

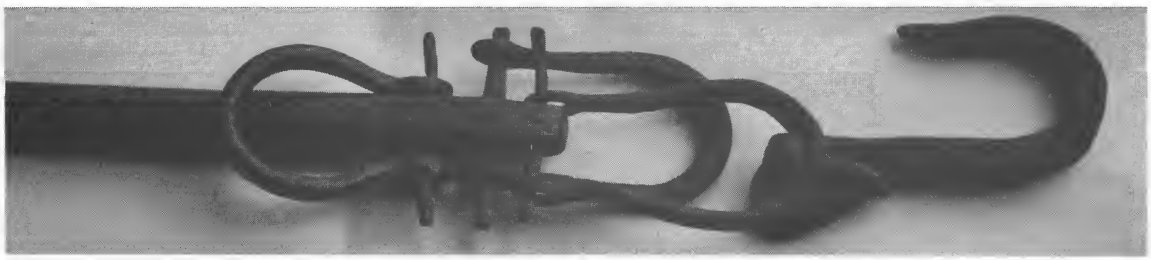
Fig. 1. Note the taper on the beam. Three beams of this style have been seen, all brass.



The copper alloy beam is 16½ inches (418 mm) long, tapering away from the load end. See Fig. 1. The three knife edges are very long, sticking out, no longer with the protective bars across their extremities, so that they have been damaged and bent. They look English or French in their proportions to the beam. If it had been an 18th century English steelyard, the knife edges would have been much shorter, but only two steelyards of the 17th century made in England survive, so no generalisations can be made. See EQM page 1379.

Another unusual feature is the narrow, attenuated end on the beam at the load end. The English, during the 18th century, put a heavy lump of metal, often nicely shaped, to balance the weight of the blade approximately, but who knows what they did earlier?

Fig. 2



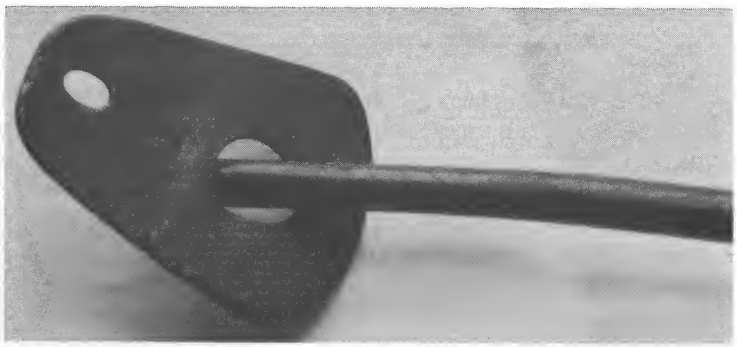
The load hook, nearest the end of the beam, is crude and substantial. The two finger loops are neater, and unusual in each being just a single loop without a swivel or extra ring, (which would make the steelyard easier to use.) See Fig. 2.

The two loops indicate that it is a turn-over steelyard, with one set of low graduations on one side of the beam, and a higher set of graduations on the other side of the beam. The lower set goes 8, 2, 10, 3, 15, 5, 20, 7. The higher set goes 24, 30, 40, 50, 60. The 'muddling' of two sets of units is unique in my experience, and leads to various questions.

What are the units? Was the steelyard carried to two countries for trade, say, in a ship? Was it specially made for one man? In spite of the loss of the original counterpoise and the probable loss of a guard round the bearings, could some tests be done? Is it possible that the hole in the beam near the knife-edges originally held another bearing for another hand-loop, intended for use with one of the extra sets of graduations? If it did have another hand-loop, how did the user obtain any accuracy at all whilst weighing?

A flat brass plate, stamped R T, slides along the beam, and is prevented from falling off by a button on the end of the blade. See Fig. 3. The counterpoise should be hooked onto this plate.

Fig. 3. If the maker could anticipate the loss of the flat brass plate, and put a button on the end of the blade, why didn't he curl the loop of the poise tightly round the plate, so that the poise could not be lost? Did he make the poise detachable because there were two poises?



The decoration of crosses and birds' eyes, (circles with dots in their centres,) goes back a long way to Roman and Byzantine scales, but it was a common decoration used by craftsmen of many cultures and periods, and gives no real clues as to its origins.

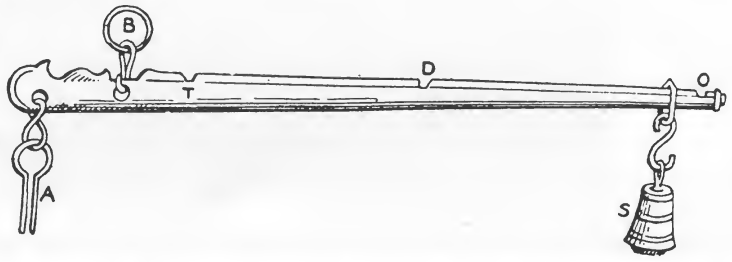
With thanks to Charles Mollan for the details and photographs.

Contemporary Comment c. 1680

The most usual money and that which passeth in the greatest quantity of silver in Ireland is Spanish Coyne known here by the name of cob, or half cob, and the quarter cob. A sort of pieces of eight at 4 s 6 d each, which they call plate pieces, Mexico's and Perues.

The cobs that are weight, as well as the french crown, pass at 4 s 9 d but if they want a grain, or turn not the scale or stilyard, they pass but at 4 s 6 d.

Fig. 1. An Instrument for weighing Foreign Coyne in Ireland. Silver. **A** The receptacle for the piece. **B** The ring to hold in the hand. **T** The notch for the weight of a Quarter-piece. **D** The notch for a Halfe Cob. **O** The notch of the weight of a four & ninepence piece, call'd a Weight Cob. **S** The steel weight.



None here, either in market or publick-house, but with small scales weigh their silver, as well as their gold, before they take it.

Here are also pieces of Portugall coyne wch go at 7 s 6 d, these onely, & now and then a piece of English money pass unweighed.

The copper halfe pence made for the ready change of this nation were after this manner but called in this Ao [Anno = year] 1681 and in the place an half penney sett forth, with his Maties [Majesty's] head on ye one side and a harp on the other, with the inscriptõn of ye English half penny.

Extract from the Journal of Thomas Dinely Esqr, giving some account of his visit to Ireland in the reign of Charles the II. Quoted by Sheppard and Musham, page 21.

Review

Public and Private Science: the King George III Collection by Alan Q Morton & Jane A Wess. Published by Oxford University Press in association with the Science Museum, 1993, ISBN 0–19–856392–2. Price £55. 709 pages. 140 colour photographs, 637 black & white photographs and 138 manuscript drawings, diagrams, trade cards, bills, etc.

This book is the same area as EQM, but it weighs nearly 8 lbs., because its many pages are printed on the heaviest, glossiest paper. This permits lovely photographs, but makes a cumbersome book that has to be propped up on a table to be read. The reviewer felt depressed whenever it was time to read the book, and tried to find other, more urgent jobs to do!

That said, there is plenty to enjoy in this book. The first section contains essays on (1) *"The King George III collection"* (2) *"Science as polite culture; early scientific lectures in London, 1700–1745"*, (3) *"A new generation of London lecturers on natural philosophy; a study of newspaper advertisements, 1745–1770"* and (4) *"The career of S C T Demainbray, 1710–1782."*

At page 123, the catalogue starts. The catalogue is divided into (1) *the apparatus of S C T Demainbray*, (2) *the apparatus supplied for King George III by George Adams in 1761–1762,* (3) *other 17th and 18th century material,* (4) *19th century material* and (5) *less significant items.* There is a huge bibliography, an inventory number index, and an ordinary index.

The book gives a good view of the pleasure taken by educated people in the 18th century in gaining some understanding of the physical laws that lay behind the simple machinery used then. Demainbray concentrated on engines and machines, pumps, carts, cranes, steam engines and pile drivers. He showed his audiences how scientific principles could make daily life much more comfortable. The more I learn about the Huguenots' approach to life, the more I admire it.

King George III had several elaborate instruments that stick in the memory because they were so fantastically ornate, but most of his collection suggests that he was more interested in the theories behind the objects than he was in their application. There are some quotations relating to the Royal Family, which smack strongly of obsequious remarks made by people who wanted some reward from royalty, although the authors present the quotations as if they would enlighten us about the personal attitudes of the royal family. There are virtually no insights into George III's personal views on science, and no quotations from his letters. Why not? The impression is given that the authors had previously presented the four essays, had adapted them slightly to go into this book, and had said "Right, that will do". But it won't do. George III was an interesting man,

living in a time of great intellectual change, who spent huge sums on a fascinating collection. We want to know more about him.

Apart from the essays, the catalogue is exciting. The catalogue was produced to go with the opening of the gallery displaying part of the King George III collection at the Science Museum in London. Because almost all the items in the collection are illustrated in the book, it gives a far better view of the collection than the sparse exhibits do.

Fig. 1. The one scale in the King George III collection that the reviewer would like to own. Anscheutz & Schlaff, London, working 1762 to 1797. The "ring and star" pointers fixed to the arm behind the disc via slots in the face. Silvered brass face & brass poise. Dark wood column and tripod. Brass pan to take coin. [Brass under-base with adjusting screws. Circular bubble level on top of the column behind the face. Crawforth considered that the level and the under-base were probably later additions.] J S Clais patented several variations in 1772.
It would be interesting to do tests to determine the sensitivity of the scale, as the great weight of the "ring and star" suggests great inertia.
Science Museum no. 1927-1146.
Photograph by M A Crawforth.

Most of the photographs have been taken at an angle, to give the maximum amount of information in one view. The moving parts of the instruments have been arranged to show as much as possible. The photographs are clearly placed beside the relevant details, drawings and text. (This seems an obvious remark, but we have used so many books where the design of the text, relative to the page and the illustrations is poor. The authors are to be congratulated on their graphic skills.) The coloured photographs are luscious, with good use of shadows to give definition. My favourite is of the painting by Zoffany of John Cuff, as it shows the details of Cuff's workshop so well. The black and white photographs are mostly of complete instruments, but some are of details of instruments. The authors could have improved the book by using much smaller photographs of the very simple objects, such as cones or cubes, and devoting the space released to photographs of details or different views of the complicated objects. The remaining illustrations are contemporary drawings from private journals and letters, illustrations from

encyclopaedias, or fine engravings from books written to help people understand the use of the instruments. These are appropriate and helpful, adding considerably to the interest of the book.

Concentrating on the scales and weights, there are 43 illustrations relating to scales, 10 manuscript drawings (connected with a photograph to illuminate the use of the scales as part of an apparatus,) 29 black and white photographs, and 4 colour photographs. The reader **ought** to be able to trace the manuscripts' sources by using the bibliography, their locations' being so crucial, (discussed in relation to the *Handlist of Scientific Instrument-makers Trade Catalogues* in the last EQM,) but cannot. The authors are such experienced curators and researchers that such omissions must be deplored.

Eleven of the scales were probably made by scale makers, and the other sixteen were made by instrument makers, as philosophical apparatus. Six of the scale beams were made of boxwood or mahogany, and four were foreign (a do'tchin, a mancur, an elliptical spring scale and one French equal-arm beam.) All the weights were made with hooks or rings attached, so that they could be used on various apparatus. They were made by instrument makers and do not fall within traditional weight types used for trade in the 18th Century.

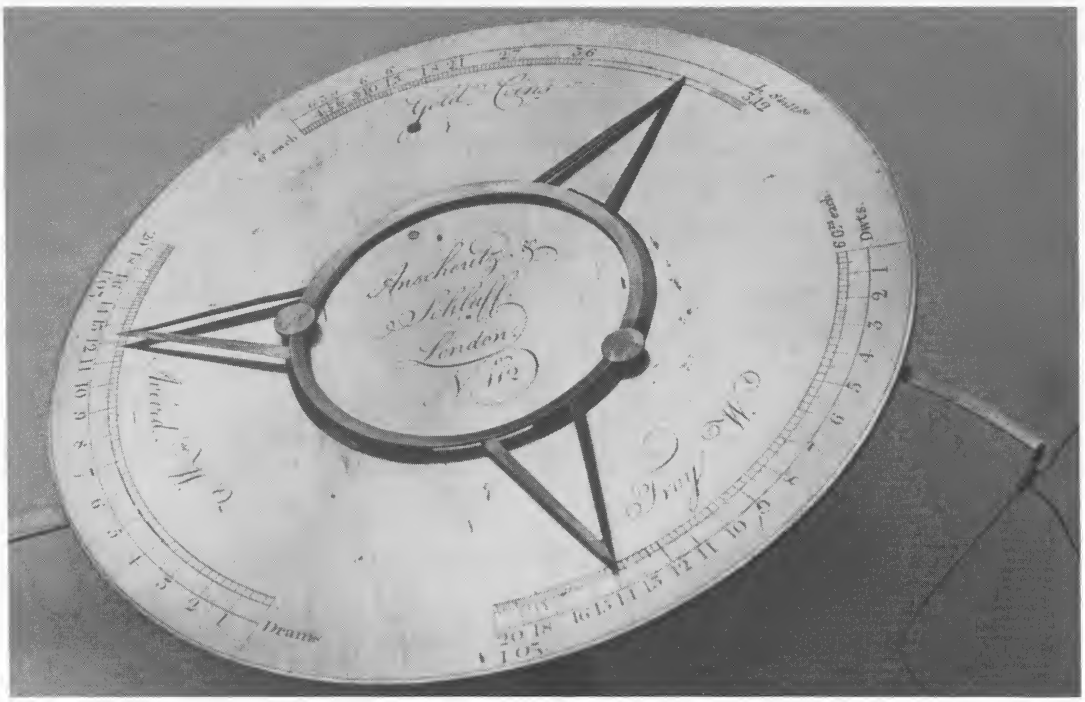


Fig. 2. A close-up view of the silvered dial. The gold coins graduations were marked in 6 d units, with the shillings marked on the inner arc and the pennies on the outer arc, from 4/6, 5/3, 6/9, 9/-, 10/6, 13/6, 18/-, 21/-, 27/-, 36/- to £3/12/-. The Avoird. Wt was graduated in drams on the outer arc and quarters of drams on the inner arc, from 0, 1, 2, up to 16 (1 0z), 18, 20. The Troy Wt. graduations were marked in 6 grs. units on the inner arc and dwts. on the outer arc, from 1 dwt. to 20 dwts, (1 oz.) It was engraved Anscheutz & Schlaff, London, No. 112 in the centre of the dial.

In one sense, ISASC members will learn nothing much about scales of the 18th century, in that the designs are very conventional and are of a type in most collections. But, if members want to think about the forces applied to a lever, forces in compound levers, or force applied by weights

positioned in various places, then we can learn a lot from the various philosophical instruments and the authors' explanations.

Apparently the bent lever principle, as we use it for weighing, was not demonstrated by 's Gravesande or by George Adams. They wrapped the cord going to the load around a pulley wheel that was closer to the fulcrum than the pivot to which the cord was attached on the long arm, (no. 1927–1804.) This brought the bent lever into equilibrium at one point, directly related to the ratio between the long arm and the short arm, but the apparatus did not demonstrate that different loads came into equilibrium as the long arm moved through its arc. Adams must surely have known this, as so many people worked on pendulum scales between 1740 and 1770. (See Hans Jeneman's article, EQM pages 571–578.)

The collection contains a superb bent–lever scale (no. 1927–1146), the Anscheutz and Schlaff triple pointer (J S Clais' patent, type 6.) It is described in the section of "other 17th & 18th century material", because it was not supplied by George Adams, but it would seem reasonable to suppose that it was bought specifically by Stephen Demainbray to put into the King George III collection, as it so clearly demonstrated the use of the bent lever principle. The dial is inscribed with the number 112, which implied that Anscheutz and Schlaff made quite a few of these scales, but the reviewer has seen no other example. The authors call it a gold coin balance, as it weighed the 11 coins current before 1774 and the Great Recoinage, but it would have been useful for any little load, using the Avoirdupois graduations or the Troy graduations. The authors failed to mention that there was a spirit level behind the circular face to be used with the screw foot, and also failed to mention its patent. As one of the few items with a patent, a short discussion of the place of patents in instrument making might have been illuminating. (Fig. 1 and 2.)

As well as dealing with the bent lever principle, the collection contains apparatus to demonstrate the compound lever, both in a straight line (no. 1927–1102) and mounted vertically with links, (no. 1927–1111.) We can immediately relate them to compound lever scales of the later part of the 19th century, but it would be interesting to know whether the principle was applied to trade scales in the 18th century. Was it another intellectual concept without an application, as with Roberval's principle?

George Adams' steelyard (no. 1927–1337) was very elegant, with its extending beam. Being used with a poise as well as a moving rod, it must have been easy to read the force wrongly. It appears to have an extending rod, going in the opposite direction, moving out behind the load pivot, but the authors have not discussed it. Adams made it in 1761, out of brass, and provided a superb drawing to explain how it was harnessed to a pair of Magdeburg hemispheres, but the photograph of the surviving steelyard shows no sign of a fulcrum. Very odd!

It must be said that the authors have not always understood the scales. The "Roman" steelyard is shown with its poise on the load hook and is said to be missing its weight pan. The mancur's two load positions and their relationship to the two sets of graduations are unclear to the authors.

I am dubious about the authors' comment that *"[The Chinese do'tchin's] origin is unknown but it has been assumed that they* [sic] *derive from Roman steelyards."* Why should the people of a culture as mature as that in China wait until the Romans could teach them how to make

steelyards? Once any culture became complex enough to go beyond bartering, it needed scales, and I see no reason to suppose that the Chinese had to be taught such a simple idea.

The do'tchin (no. 1927–1130) apparently featured as a high–light at the lectures of Griffiss in the mid–1750s. I had always wondered where Benjamin Martin had seen do'tchins, his [first?] coin scales being a straight copy of the Chinese do'tchin. See EQM page 269.

The precision balance made by Jeremiah Sisson before 1789 (no. 1927–2040) showed some interesting features. It had cone bearings and a pointer going down between the supporting pillars. The handle of the lift was a circular knob, suggesting a twist lift, but this would mean that twist lifts started earlier than we had thought hitherto. The base had a spirit level and screw feet for adjustment. [Michael Crawforth said that instrument makers invented everything fifty years earlier than any scale collector would think possible.]

This book is useful in showing the teaching uses of scales for scientific experiments, and shows ways of teaching some of the principles of weighing. It is also a wonderful catalogue of the King George III collection, being so well illustrated. It sets scales into the context of the instruments of their day, and shows how relatively primitive scales were, compared with the more elaborate instruments. It is easy to see why experimental scientists considered that it took six months to become sufficiently familiar with the idiosyncrasies of their balances, and to become accurate in their use. It is also easy to see why so many variations of scales were tried between about 1760 and 1850, as the basic flaws were gradually understood.

Should ISASC members spend £55 on this book? If you like scientific instruments, I wholeheartedly recommend this book, as the large subsidy it was given means that it is fantastic value for money. If you are only interested in scales, you would probably do better to wait for books more specifically written about scales. D F C H

Note: the term "science" and "scientific" had not invented in the 18th century. "Philosophy" meant *"the knowledge of things natural and moral, grounded upon reason and experience."* Hence, a "philosophical instrument" was one that taught about the natural world, and demonstrated the forces that act upon it.

Note: we are requested by museums to use their inventory numbers when referring to their instruments, so that no confusion can arise. This explains the numbers in parenthesis throughout this review.

Roman Steelyard, reply

from R J HOLTMAN

EQM, page 1819, published the Roman Steelyard article by A V Simcock. I am not an expert in the field of scales and balances, but this article triggered something. I read *Römische Waagen und Gewichte aus Augst und Kaiseraugst,* written by Alfred Mutz, and published as *Augster Museumshefte 6,* Augst, Switzerland, 1983. It goes into great detail about the length of different parts of steelyards. Regarding the graduations it is less clear, although the possible load is calculated for most steelyards described.

Back to the puzzle. The drawing shows three fulcrums, but in fact two are real and the middle one is fake, as there are only two graduations on the beam. The real load pivot is about 6 mm from the end of the short arm of the beam, originally with a ring with hooks hanging from the "waist." If the middle fulcrum were real, a third graduation should be available on the long arm

of the beam. The eyes of the fulcrum are bent down to the short arm; the exact centre was difficult to find but the drawing made it clear.

Inspecting the graduations on the photograph, I noticed a long slash between the short dotted slashes: the sixth before the clover sign. I suppose the clover meant 1 Roman pound, each short slash and dotted slash 1 uncia, and the long slash 6 uncia or ½ pound. This resulted in a graduation from 2 uncia– 1 pound and 3 uncia. On the second graduations I suspect the clover sign to be the mark for 2 pounds. This resulted in a graduation from 1 pound and 2 uncia to 2 pound and 2 uncia (about 709 grams.) There is a (small) chance that the values could be multiplied by two, giving a total capacity of 4 pounds and 4 uncia, (about 1419 grams.) But twenty or thirty British pounds is far too much for this feeble steelyard. On all steelyards with two graduations that I checked, the two graduations overlapped, so there was no gap between them. Thinking of a culture with two different types of units, differing by a factor of 2.4 (distance between the load pivot and both fulcrums, 27.6 / 11.5 mm. = 2.4, without taking into account the mass of the loose hanging hook) fails to take into account the beauty of the principle of a steelyard! The Romans used on steelyards a decimal graduation for numbering the multiples of 10; a decimal sub–division of the Roman pound is new to me, (but, again, I'm not an expert in this field.)

I tried to find an equilibrium for both graduations, by calculating the mass of the missing ring plus hook and the poise, omitting the loose hanging hook. Without the loose hook I approached a ring plus hook mass of 10.9 grams and a poise of about 4 uncia, (111.3 grams.) These values don't fit the second graduations. Perhaps the article sent me in the wrong direction, with the ***light*** and the ***heavy*** graduations interchanged, but I didn't spend more time making calculations! Moreover, a ring plus hook of only 10.9 gram is too light to carry 709 gram. I guess a ring plus hook of about 40 gram is more realistic.

About left–handed use of steelyards; in my collection I found only two steelyards made for right–handed operation, of which one has two graduations (a turn–over steelyard.) Both are rather new, being 19th/20th century. Of the Roman steelyards I've seen, all seem to be intended for left–hand use. But to say that a particular culture used the steelyard in the right hand??

These thoughts may help to gain more insight into this ancient (antique!) steelyard.

Reply from D F Crawforth–Hitchins:

Tony Simcock and I studied this sad remnant to the best of our ability. Ritzo is correct to reject the middle pivot, and tell us that the load was hung from a ring. Since seeing the beam in the Museum of the History of Science, Oxford, I have paid more attention to Roman steelyards, and had already come to the same conclusion.

The fact that steelyards normally had overlapping graduations of the same units on both sides of the beam is well taken, and I think is correct. It makes the steelyard marked RT (page 1847) seem very odd.

Having in our possession a Byzantine steelyard (country of origin and date unknown,) with a beam of identical length and thickness (but slightly different pivot points) I dared to test its maximum capacity. Being bronze, I was afraid that the hooks would be brittle, and snap under the load, but I loaded the heavy side to 9 British lbs (4 kilo) which was still below the maximum capacity. So perhaps these little bronze steelyards were not so feeble! And, by the bye, it was for use in the right hand.

Just for interest, I tested the capacity of our 8" (200 mm) wooden steelyard, thought to be French, and that took a load of about 42 lbs (19 kilos) on its heavy side. That surprised me.

Can anybody else throw light onto the Roman (?) steelyard? Please write to the editor.

Colonial American W & M

By E MAHONEY

Fishing boats had been coming to the American shores for untold decades prior to the first permanent settlement of the Pilgrims in Plymouth, Massachusetts in 1620. Probably the fishermen were using containers and measures which would have conformed with the standards of their home ports. (Plymouth, England, was the home port of a fishing fleet of fifty or more boats which sailed each year to the Banks of Newfoundland, and was also the home port of other ships trading down the North American coast.)

Usher [1] states that *"among the materials brought* [by the Pilgrims] *were an elaborate set of tools for wood cutting, coopering* [barrel-making] *and carpentry, as well as equipment for a blacksmith's shop and an anvil."* A lack of dependable food supplies rather than a lack of equipment made the early days of settlement difficult, so an allocation of land was one of the earliest needs for the new settlers. The measurement and designated location of land imply that the New England settlers must have brought surveyors' chains or equivalent measuring devices.

A possible source of volumetric measures was John Alden. Andrews [2] states that *"Alden was employed as a cooper to look after the beer hogsheads, and remained in the colony instead of returning to England,"* having been hired in 1620 in Southampton. Hankerson [3] states that *"cooperage occupied the decks and the hold of the Mayflower.....Azel Ames, author of "The Mayflower and her log" tells us that provisions carried in barrels and hogsheads included biscuits or ships' bread, oatmeal, rye meal, beef, pork, hams and shoulders, salt, beans, cabbages and peas, vinegar, beer, brandy and gin."* Hankerson continues *"By the fifteenth century the wooden barrel was performing as a measure as well as a container. In England a Statute of 1423 fixed the capacity of a hogshead at 63 Old Wine gallons* [equal to 52½ Imperial gallons.] *During the reign of Richard III a wine barrel was standardised at 31½ gallons....During the reign of Henry VIII legal capacities of several other barrels were set by Statute. The London ale barrel was standardised at 32 beer gallons. It was soon the practice to measure oil, spirits, tar and pork by the Wine barrel, and vinegar by the 34 gallon barrel."*

John Alden and the Mayflower carpenters seem to have been the source of the first Plymouth Colony containers and measures. Whether the barrels, bushels, quarts, pints and pottles [two quarts] initially conformed to the Winchester standards is not known, but later regulations made this a requirement.

Amongst the earliest Virginia Colony records [4] the Laws and Orders of the General Assembly of 5th March 1623/4 merely stated *"there be no weights nor measures used but such as shall be sealed by officers appointed for that purpose."* [To seal = to impress, burn or mark indelibly.]

The first legislation in Maryland on the subject was in the Act for Weights and Measures which was engrossed [to engross = to write a fair copy over a rough draft of a law] at the Assembly in Feb. 1638, which, although not actually passed, [according to Alexander [5]] has been preserved in the Archives. This Act provided that *"there shall be one standard measure throughout the Province, as shall be appointed by the Lieutenant General."* It then prescribed how the dry measures of shelled corn be regulated according to the age and presumed dryness of the grain; and finally interdicted [to interdict = to ban] the use of all weights and steelyards not appointed by the Lieutenant General, except the same be small and *"sealed in England."*

In the Records [8] of the Colony of New Plymouth in New England for January 1633/4, it is recorded *"That whereas great abuse may arise by diversity of measures, it is ordered that all measures be brought to the messenger or constable of Plymouth to be sealed, and that it be lawful for any to refuse any that hath not the seale prefixed thereon."*

Later, at a Plymouth Court [8] held on the 5th of July, 1635, *"It was decreed that the new bushel (being a sealed bushel brought out of England, of Winchester measure) should be allowed, and no other; and all other measures to be brought into the constable, to be made conformable to the same, and so to be sealed by him, with the seal appointed for that end; and this to be done by the last of the present month. But notwithstanding that, all former bargains and sales that were made before this day, they are to be fulfilled by old measure."*

From 7th December 1641 in Plymouth [8] it was considered *"meet that the following be repealed: 'That all weights and measures in every town within the government be made equal by one thereunto especially appointed and that a bushel, a half bushel, a peck and a half peck be procured to be made by the* [Massachusetts] *Bay standard and that the Grand Jurymen of every town do assist Josuah Pratt in making all measures even accordingly and these to be done by the end of March next.' "*

In 1636 Plymouth Colony Laws *"enacted by the Court that one common standard be used by all for weights and measures and that according to Winchester which is the standard of England. "*

In 1652 it was *"enacted by the Court that every town within the Government shall have a standard for measures of Corn made by those that are provided at Plymouth by a former order of Court for that end to try and seal their measures by which are to be made uniform amongst them and to be made round; and these to be made by the last of November 1658 and to be kept by the sealers of every town for the towns use."* In the same year the Court required *"That in every town within this Jurisdiction there be one appointed to try and seal measures; and to have for every measure four pence which shall be tried and sealed by him; and only round measures to be allowed to buy and sell by; and that the several towns shall choose a fit person for each of them for sealer and to present him to a magistrate to be sworn."*

In 1661 the oath of a sealer of measures was *"Whereas you are chosen to the office of a sealer for the town of _____ you shall during your continuance in your said office truly and faithfully seize* [to size = to check] *and seal all such measures as are or shall be at any time brought in unto you for that end; according to such Standards as are allowed and provided by the Country so help ... ."*

The law of 1645 stated *"It is enacted by the Court that none shall sell by any unsealed weights and measures which are not weights and measures by the Standard; and that if any shall do so they shall lose such weights and measures and make restitution to the parties so wronged by such weight and measures; and shall pay to the Colony's use for such default of false weight and measure; for the first time six shillings, for the second time thirteen shillings and four pence, and for the third time twenty shillings, and such weights and measures to be burnt; and that a pile of weights according to Winchester be procured to be the Standard; and that the sealer shall have for sealing a penny for every weight under a quarter of a pound; and for all above a quarter of a pound to six pound two pence a piece; and for all above six to a hundred pound four pence."*

Also in 1645 it was enacted that *"every miller within this Jurisdiction shall have two toule* [toll = a portion of corn taken by the miller as payment for grinding other people's corn] *dishes vis: a quart and a pottle but to be so made that upheaped they will hold no more but a quart and a*

pottle by the measure allowed and those to be sealed by the last of November 1658 or else to pay ten shillings for every month so long as the said miller keepeth them unsealed; and that all millers shall provide scales and weights to weight mens Corne by; as occasion shall require."

For the cooper it was law from 1652 that *"all such cask as shall be made by any cooper within this Jurisdiction shall have the first two letters of his name set on every such cask he makes by a burnt mark; upon penalty of the loss of such cask the one half to the informer and the other half to the Country."* Further, [9] *"It is enacted by the Court that all coopers within this Government; are to make all their cask according to London gage upon the like penalty."* *

Whatever the complications among the settlers in Plymouth and the Massachusetts Bay Colony centred at Boston, from the 6th July 1646, it was enacted by the [Plymouth] Court [9] that the *"Massachusetts Bay new bushel shall not be used to buy or sell by nor any measures made thereby and that the old Iron bound bushel is established to be the measure and standard for all the towns within this Government and that all measures used within this Government shall be made thereby and if any person or persons do sue any other either to buy or sell by they shall pay xij^{d} a piece to the Colony's use."*

Two interesting and detailed Massachusetts records may be of greater interest. The Dorchester [Massachusetts] Town Records [10] report that *"at a general town meeting the 14:1;82* [1682] *Weights are provided by Constable Elisha Foster; for to be a standard for the town according as the law requireth; by which all other weights are to be sized and sealed; divers of which are bell fashioned viz.; one 56; one 28; one 14; one 7; one 4; one 2; the rest are flat weights and are one pound; one half pound; one quarter; one eight part; one ounce; as also one half ounce; one quarter of an ounce; one eighth; one sixteenth of an ounce; These are all delivered to William Pond the 23:3:82* [1682]."

Later it was recorded [10] that *"the 13 Feb 1690/91 there was delivered to Sarg.*[eant] *Samuel Topliff, the weights and measures, that were the town standards, to try weights and measures by:*

of weights of bell fashion: one 56 pound; one 28; one 14; one 7; one 4; one 2

of flat brass weights: 1lb; ½; ¼; ½ quarter; 1 ounce; 1 ½ [one one–half]; *1 ¼* [one one–quarter]; *1 $^{1}/_{8}$* [one one–eighth];

of measure: one ½ bushel; peck; ell; yearden [yard,] *eale* [ale,] *quart; wine pint; two sealing eiorns* [irons]."

At a meeting of the Boston Selectment 31st March 1718, the following is recorded: [11]
"Inventory of Standards, etc., belonging to this town for the use of the Sealer of weights etc., Measures delivered by Captain Ephraim Savage the 21st of January last into custody of the Selectment, vis^{t}:

a half bushel and a peck of cast brass
a half bushel, a peck & a ½ peck, of hammered copper
a wine Gall[on], a quart, and pint of cast brass
a half pint, a Gill and ½ Gill of pewter
a Beer quart and a pint of cast brass
a 56 lb., a 28, 2 14, a 7, a 4, a 2, a 1 lb., a ½ lb., a ¼
a 2 oz. a 1 oz of cast brass
a half oz. and ¼ of oz. of lead
one brand, 3 stamps,
2 large hand hammers,
two large Chissels
2 punches, one shave,
one paring knife of iron or steel
one wooden rule

a pair of Tryangles [to support a large beam]
a Large Beam with wooden scales [pans]
2 pair of Brass Scales with beams."

The preceding material comprises a preliminary view of some of the information available on early American use of weights and measures. It is obvious that American Colonial history is a continuation of English history in its use of weights and measures. A more detailed and analytical study is in progress.

*As will be noted from the dates, this series of acts is a recapitulation. Both physical access to the relevant documents and time limitations precluded the detailed examination of all pertinent references. More careful study is certainly warranted.

Bibliography

1 Usher, R G	The Pilgrims and their History, Macmillan Co, New York, 1918.
2 Andrews, C M	The Colonial Period of American History, Vol. 1, Yale U Press, New Haven, 1934.
3 Hankerson, F P	The Cooperage Handbook, Chemical Pub. Co, Brooklyn, New York, 1947.
4 Bradford & Knopf	Of Plymouth Plantation, New York, 1970.
5 McGuire, J E	Old New England Splint Baskets and How to make them, Schiffer Pub Co, West Chester, Penn, 1985.
6 Hening, W W	Statutes at Large of Virginia, Phila, Penn, 1823.
7 Alexander, J H	Report of the Standards of Weight and Measure for the State of Maryland, Baltimore, 1845.
8 Shurtleff, N B (ed.)	Records of the Colony of New Plymouth in New England, (Court Orders,) Boston, 1855.
9 Pulsiver, D (ed.)	Records of the Colony of New Plymouth in New England, (Laws,) Boston, 1861.
10	Dorchester Town Records, 4th Report of the Boston Record Commissioners, Rockwell and Churchill, Boston, 1885.
11	Records of the Boston Selectmen, 1716–1736, 13th report of the Boston Record Commissioners, Rockwell and Churchill, Boston, 1885.

From the editor: This article is published in its entirety, despite the fact that it concerns measures more than it deals with weights, because, during this early period, laws normally bracketed the two subjects and it would be unhelpful to omit the references to measures. However, please do not look on this as a precedent. Measures are outside the remit of ISASC.

Catalogue

from C SAIT

Charles Sait draws our attention to an exhibition held in Düsseldorf, on the 17th to 21st Feb., 1990. An attractive catalogue was produced, called *Kulturträger Handel ...und ewig schwingt die Waage* [Cultural Trade...and the balance oscillates eternally.]

The slight, generalised text is, naturally, in German, but all ISASC members can enjoy the 25 colour photographs of scales and weights, (and the 12 of non–metrological subjects.) As Tyll Kroha and Thomas Lautz arranged the exhibits, it is not surprising that many of the weights are very fine. They include a Greek talent weight of about the 7th century BC shaped like an animal's head (a fox?) and a Greek drachma weight of the same period shaped like a fish, complete with scales, gills and fins.

There is no address given as to where this catalogue may be obtained. Perhaps one of our German members can help.

Fairfax County W & M, 1744 By N NETHERTON

The Standards of the County of Fairfax, cast in 1744, are kept today at the Masonic Memorial, Alexandria, Virginia. They were in continuous use from 1744 until 1861. The Alexandria Gazette of 4th December, 1860, reported *"The Alexandria Court authorised Thomas Whittington, sealer and inspector of weights and measures, to purchase for the use of the county sets of United States standard dry and wine measures, of copper or pewter, and a set of the standard weights of copper or iron. These weights will, as we have heretofore announced, supercede the Old English standards of 1744, so long in use in this city."*

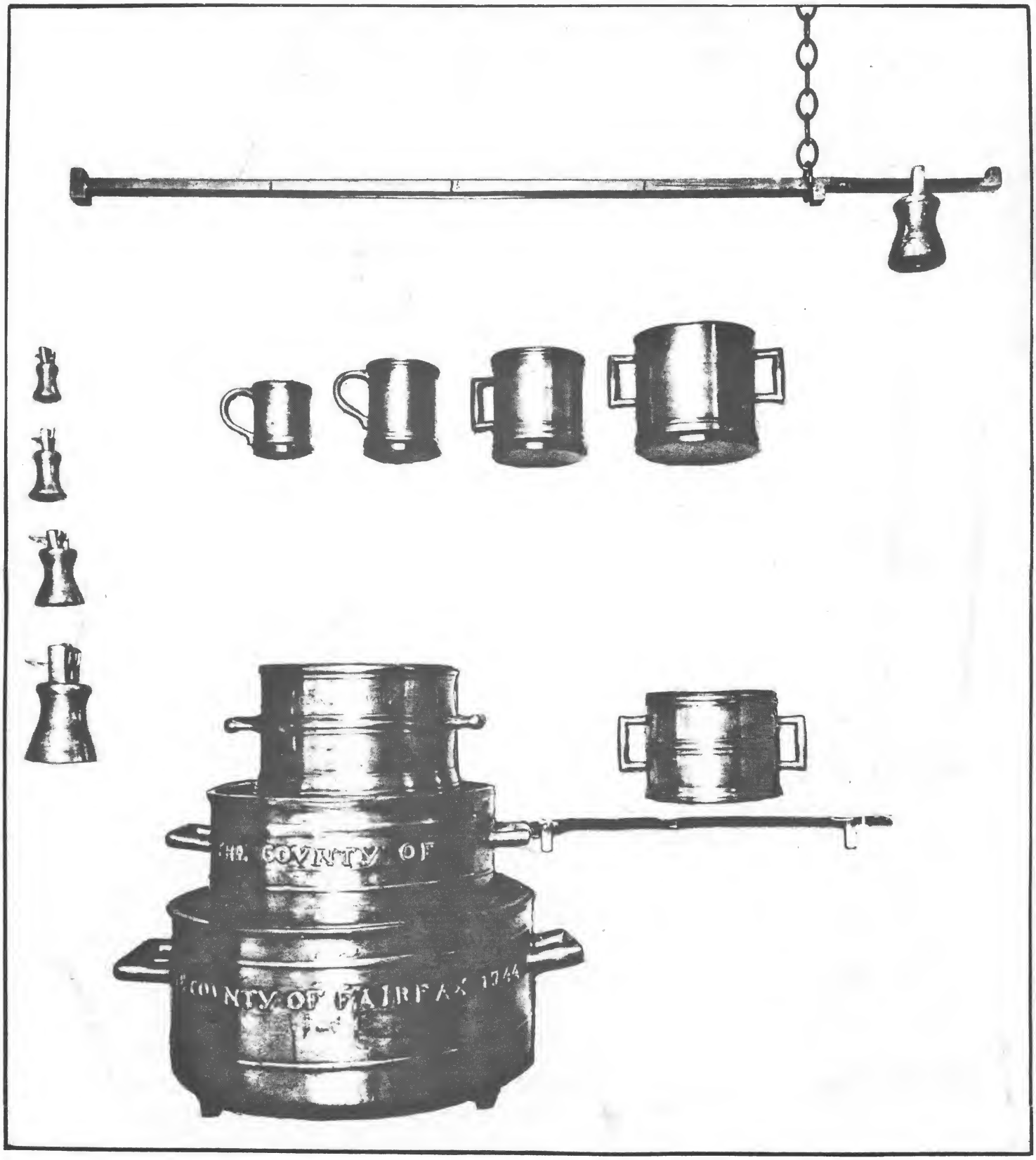
In 1976, Donald Hughes, Sealer of Weights and Measures, County of Fairfax, Commonwealth of Virginia, weighed and measured the "County of Fairfax, 1744" weights and measures at the George Washington Masonic Memorial Museum in Alexandria, Virginia. He used a modern set of portable standards. The following figures reflect his findings.

Measures of mass	½ pound weight	bronze bell metal	0.49 lbs	2% loss
	1 pound weight	bronze bell metal	0.98 lbs	2% loss
	2 pound weight	copper	1.98 lbs	1% loss
	4 pound weight	copper	3.96 lbs	1% loss
	7 pound weight	copper	6.93 lbs	1% loss
Linear standard	45 inches on one side, 9 inch units with a bar at 36 inches, on the reverse			
Dry measure	Bushel	brass	inside diameter 18½ "	inside depth 8"
	½ Bushel	brass	inside diameter 14½ "	inside depth 6 3/8"
	Peck	brass	inside diameter 10"	inside depth 6 7/8"
	½ Peck	brass	inside diameter 7½ "	inside depth 6"
Liquid measures	Gallon	brass	inside diameter 6 7/8 "	inside depth 6"
	Pottle	brass	inside diameter 5¼ "	inside depth 5¼ "
	Quart	brass	inside diameter 3 7/8 "	inside depth 4¾ "
	Pint	brass	inside diameter 3 1/8 "	inside depth 3½ "

The set was inspected at Founders' Company, and stamped with a crowned G, [George II] a dagger, [City of London] A, [Avoirdupois] and a ewer, [from the Arms of Founders' Company.] It was not stamped at the Exchequer with a Portcullis, as the set would have been, if it had been destined for an English County.

The founder pressed wooden letters into the sand before the casting was taken. The bold letters round the bushel and ½ bushel read "THE COVNTY OF FAIRFAX 1744." The smaller items were engraved with the same words.

Unfortunately, we have only a poor photograph, taken with a flash light into the case containing the set. The gross shadows have been painted out, but the resulting photograph does not do justice to this magnificent set.



FAIRFAX COUNTY WEIGHTS AND MEASURES 1744